

Chicago Midway International Airport Air Traffic Procedural Changes Environmental Assessment

Final

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Prepared by:
**United States Department of Transportation
Federal Aviation Administration**



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1 INTRODUCTION

As part of its effort to achieve Next Generation Air Transportation System (NextGen) goals and to improve operations at Chicago Midway International Airport (MDW), the Federal Aviation Administration (FAA) proposes to make changes to air traffic procedures, including the implementation of new Area Navigation (RNAV)¹ flight routes and procedures, inclusive of Required Navigation Performance (RNP)², and changes to departure headings at MDW. These changes will enable the FAA to manage air traffic more efficiently, while maintaining or improving safety associated with aircraft flying into and out of MDW. FAA has prepared this Environmental Assessment (EA) to identify the potential environmental impacts associated with these changes.

NextGen is the FAA's plan to modernize the National Airspace System (NAS) using satellite-based navigation to allow aircraft to fly routes that are more direct. Under the Performance-Based Navigation (PBN)³ framework, the FAA is defining advanced performance requirements for technologies that leverage these new capabilities, including RNAV and RNP. Routes and procedures designed according to RNAV and RNP specifications improve the precision of operations in the terminal area, helping to enhance reliability and reduce delays.⁴

In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and the Airport and Airway Improvement Act of 1982 as amended, the FAA must consider the environmental impact of Federal actions such as the modification of RNAV/RNP procedures and changes to departure headings as proposed at MDW. Guidance for considering environmental impacts of aviation projects is found within FAA Order 1050.1E, Change 1, "Environmental Impacts: Policies and Procedures,"⁵ and in the Council on Environmental Quality (CEQ) "Regulations for Implementing NEPA."⁶ Additional regulations are also referenced as necessary, including DOT 5610.3c.

FAA has prepared this Environmental Assessment (EA) to assess the proposed air traffic procedures due to their potential to cause significant environmental impacts. This assessment

¹ RNAV is a method of navigation that permits aircraft operation on any desired flight path within the coverage of ground or space based navigation aids or within the limits of the capability of self-contained aids, or a combination of these. In the future, there will be an increased dependence on the use of RNAV in lieu of routes defined by ground-based navigation aids. (FAA, "Aeronautical Information Manual," Chg. 1, sec. 1-2-1, July 26, 2012.)

² Required Navigation Performance (RNP): RNP is RNAV with on-board navigation monitoring and alerting, RNP is also a statement of navigation performance necessary for operation within a defined airspace. A critical component of RNP is the ability of the aircraft navigation system to monitor its achieved navigation performance, and to identify for the pilot whether the operational requirement is, or is not being met during an operation. This on-board performance monitoring and alerting capability therefore allows a lessened reliance on air traffic control intervention (via radar monitoring, automatic dependent surveillance (ADS), multilateration, communications), and/or route separation to achieve the overall safety of the operation. RNP capability of the aircraft is a major component in determining the separation criteria to ensure that the overall containment of the operation is met. (FAA, "Aeronautical Information Manual," Chg. 1, sec. 1-2-2, July 26, 2012.)

³ Performance-Based Navigation (PBN): Area navigation based on performance requirements for aircraft operating along an air traffic service route, on an instrument approach procedure or in a designated airspace. (FAA, "Pilot/Controller Glossary," July 26, 2012; International Civil Aviation Organization [ICAO] definition.)

⁴ Federal Aviation Administration (FAA), "Fact Sheet – NextGen Goal: Performance-Based Navigation," March 2010: http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=10856.

⁵ FAA Order 1050.1E, Change 1, "Environmental Impacts: Policies and Procedures," March 20, 2006.

⁶ Code of Federal Regulations, Title 40, Part 1500.

considers several air traffic procedural changes but no changes are proposed to alter the runways, taxiways, navigational aids (NAVAIDs)⁷, or other infrastructure on the airport itself.

This EA describes the Study Area and provides background information on the proposed project, describes the Purpose and Need for the Proposed Action, identifies and evaluates reasonable alternatives to the Proposed Action, and discloses the potential environmental impacts associated with implementation of the proposed action.

1.1 BACKGROUND

MDW, located ten (10) miles from downtown Chicago, is the 27th busiest airport in the United States in terms of passenger traffic and the second largest in the Chicago metropolitan area, with over 8.5 million enplanements. MDW generates \$7 billion in economic activity and supporting 90,000 jobs.⁸ However, this heavy economic and travel demand has resulted in significant airspace congestion, sometimes rendering MDW worst among the nation's largest airports for on-time departures.

MDW is a prime candidate to leverage the capabilities of new RNAV procedures, inclusive of RNP, because of its large volume of aircraft operations, including a high number of RNAV-equipped aircraft. With no action, efficiency will further deteriorate and delays will build as air traffic continues to grow in the NAS and at MDW. In order to improve safety and efficiency of operations in the Chicago Midway Airspace, and accommodate future air travel needs, the FAA proposes implementation of PBN procedures, using advanced technologies that are in line with the FAA's NextGen goals. Figure 1 shows the MDW airport configuration and runway layout.

⁷ Navigational Aid: Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (FAA, "Pilot/Controller Glossary," July 26, 2012.)

⁸ Chicago Board of Aviation, About Midway International Airport:
www.ohare.com/About/Midway/AboutMDW.aspx.

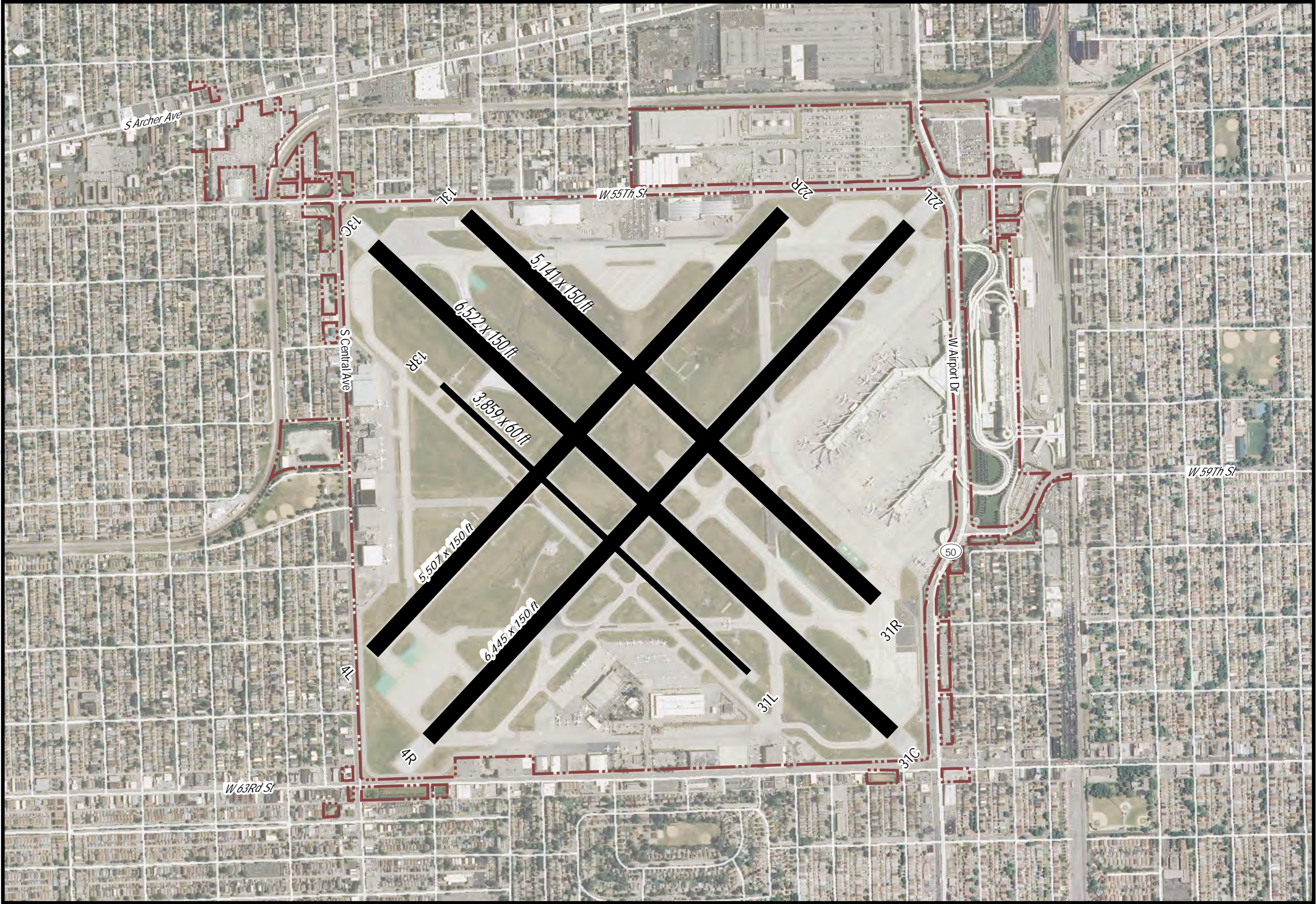
Legend:

- Approximate Airport Boundary
- Airport Runway
- Highways
- Secondary Highways
- Local Roads

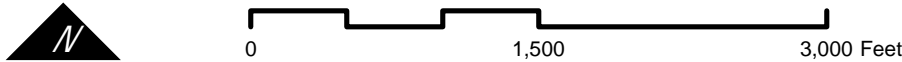
Notes:

Figure 1

Chicago Midway International Airport (MDW)
Layout and Runway Configuration



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (Roads), March 14, 2012; Unites States Department of Agriculture (USDA), (Aerial Photography - NAIP), January 23, 2013
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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1.2 STUDY AREA

The Chicago Midway EA Study Area consists of airspace delegated to the Chicago Terminal Radar Approach Control (C90) and the Chicago Air Route Traffic Control Center (ZAU). This EA closely examines operations within the boundaries of C90 and ZAU airspace due to the complexity of interactions between MDW operations and other operations to, from, and through the study area. Figure 2 depicts the MDW EA study area and selected airports in the Chicago region. Figure 3 provides a representative illustration of the airspace delegated from the C90 TRACON to the MDW Air Traffic Control Tower (ATCT).⁹ Exact dimensions of this airspace change are based on air traffic flow conditions.

⁹ Air Traffic Control Tower (ATCT): A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by a control tower or to transit the airport airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or non-radar). (FAA “Pilot/Controller Glossary,” July 26, 2012.)

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Chicago Midway

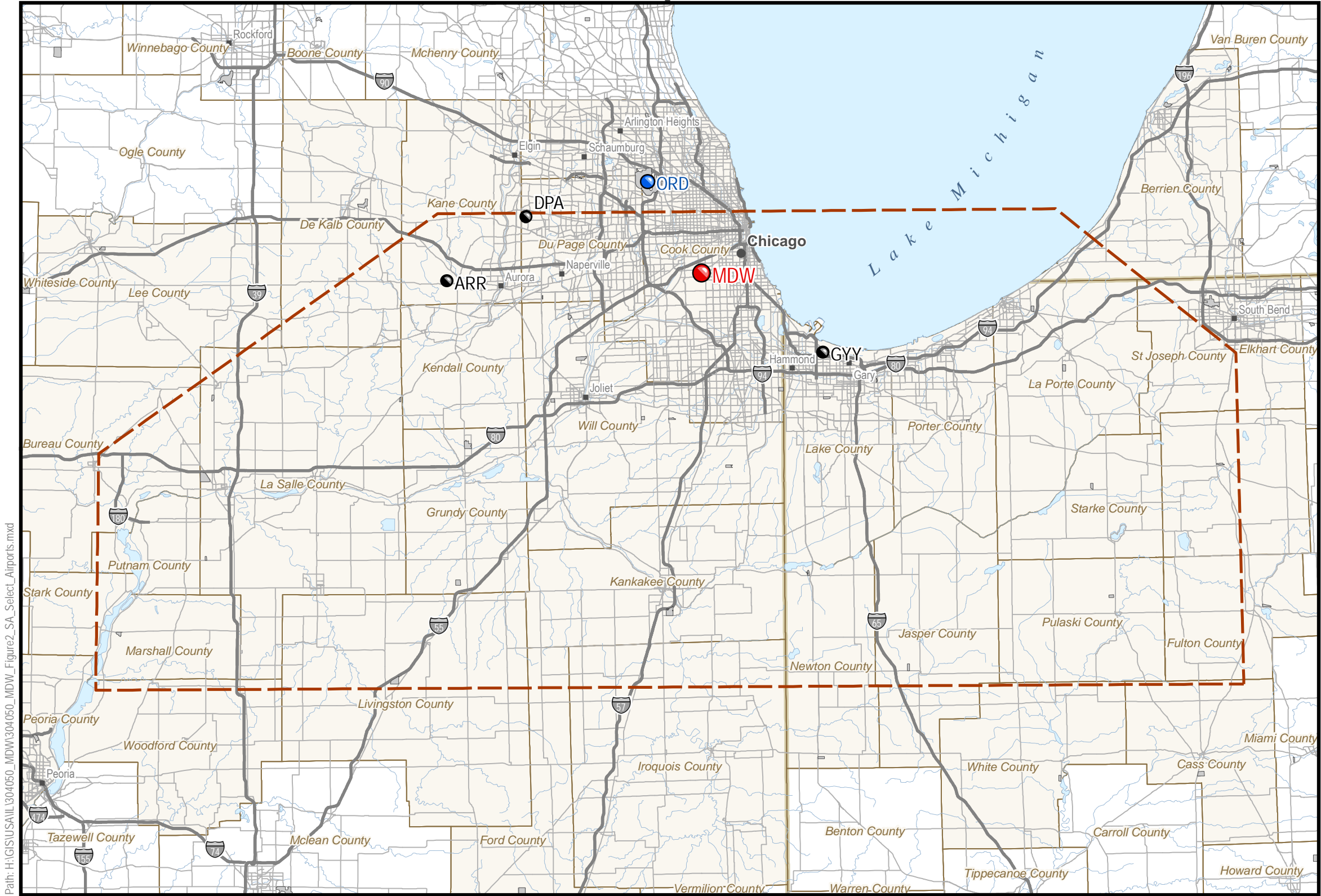
Air Traffic Procedural Changes, Environmental Assessment

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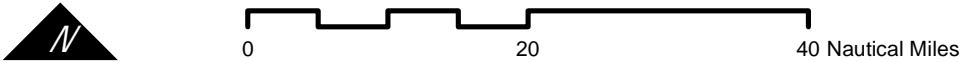
- Study Area Boundary
- Airports
 - Chicago Midway International Airport (Study Airport)
 - Chicago O'Hare International Airport
 - Other Air Carrier and General Aviation Airports Considered within Study Area
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GGY - Gary/Chicago International Airport

Figure 2
Midway Study Area and Selected Airports



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

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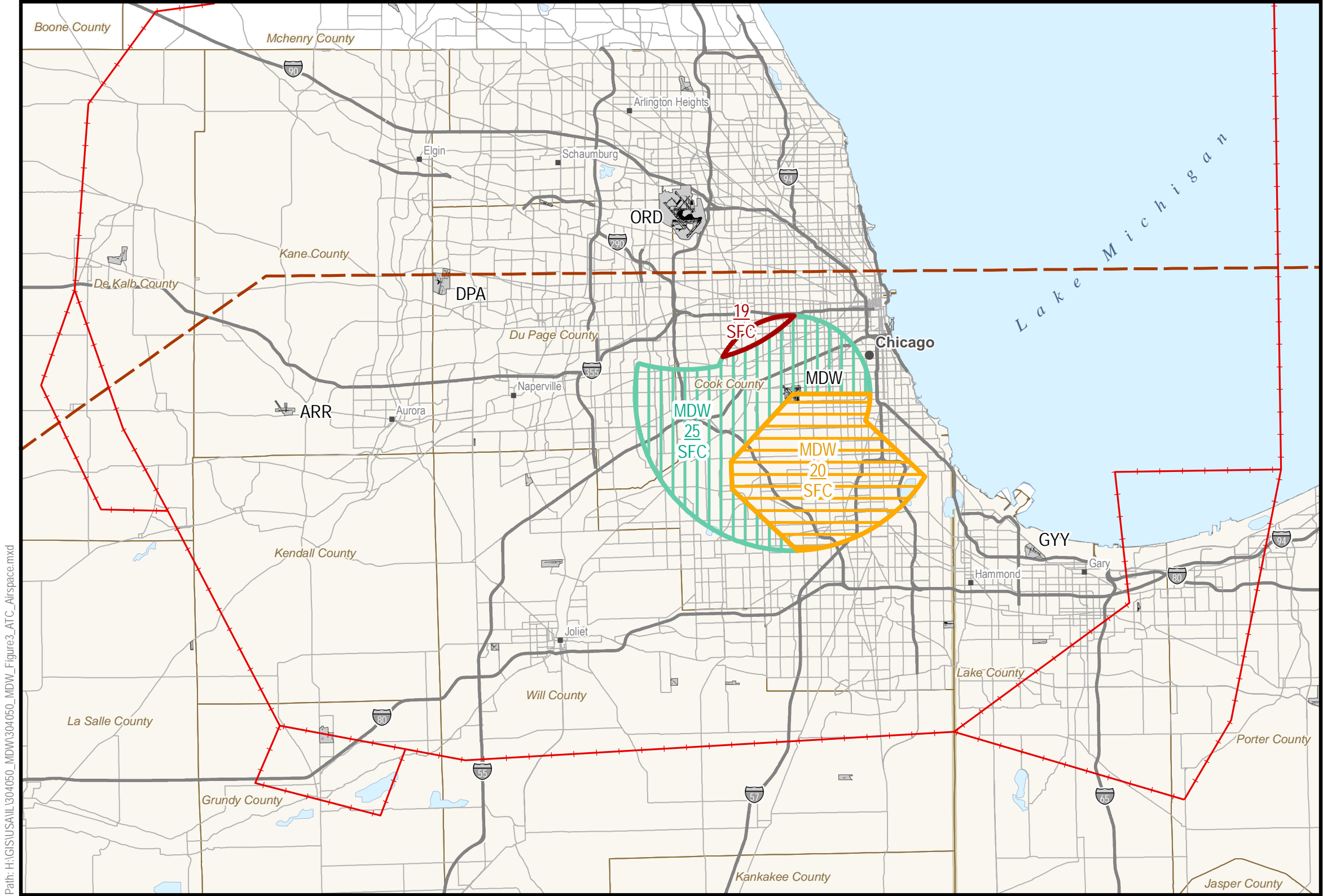
- Study Area Boundary
- Airports
- Runways

- Airspace Delegated from Chicago TRACON (C90) to MDW Air Traffic Control Tower
- 19/SFC
 - MDW 25/SFC
 - MDW 20/SFC
- Ceiling/Floor in hundreds of feet above mean sea level

- C90 TRACON Boundary
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:
Exact dimensions of this airspace change based on air traffic flow conditions.

MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport



Path: H:\GIS\US\AIL\304050_MDW\Figure3_ATC_Airspace.mxd

Data Source: FAA (TRACON Boundary), February 26, 2013; Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

Figure 3
Air Traffic Control Airspace in Vicinity of Midway Airport



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1.3 THE NATIONAL AIRSPACE SYSTEM AND AIR TRAFFIC CONTROL

The *Federal Aviation Act of 1958* delegates various responsibilities to the FAA, including control over the use of the nation's navigable airspace and regulation of civil and military operations in that airspace in the interests of safety and efficiency.¹⁰ Within the National Airspace System (NAS), the FAA manages aircraft takeoffs, landings and the flow of aircraft between airports through an infrastructure of air traffic control and navigation facilities, people (e.g., air traffic controllers and maintenance personnel), and technology (e.g., radar equipment).

The NAS is one of the most complex aviation networks in the world and when the FAA proposes changes to its design and operation, it must preserve four principles: (1) maintain or improve system safety; (2) improve efficiency and reduce delays; (3) increase system flexibility and predictability; and (4) promote aviation advancement through implementation and evolution of emerging technologies. Inside the FAA, the Air Traffic Organization (ATO) is responsible for the safe and efficient use of navigable airspace. Additionally, ATO must comply with NEPA and other applicable laws and regulations when designing or redesigning procedures for use in the NAS.

1.3.1 Air Traffic Control within the NAS

Air Traffic Control (ATC) is the term for the combination of people and the software, hardware, and facilities used to guide or direct aircraft along a flight route. ATC is responsible for the separation of aircraft to maintain safety and expedite the flow of traffic operating in the NAS.¹¹ ATC maintains the separation of aircraft by directing pilots to fly specific routes, altitudes, and airspeeds. As aircraft move from origin to destination, ATC personnel function as a team and transfer control of aircraft from controller to controller.

Control of a typical commercial aircraft flight begins with a controller in an ATCT issuing departure instructions to the pilot. ATCTs control departing and arriving flights that are normally within five miles of the airport, as well as aircraft on the ground at the airport. Their airspace extends upward to 2,000 or 2,500 ft. above ground level (AGL).¹² ATCTs can use visual contact or radar to track arriving and departing aircraft and those on the ground in clear weather conditions.

Once the aircraft leaves the vicinity of the airport, a Terminal Radar Approach Control (TRACON)¹³ facility normally assumes responsibility for guiding the flight from the MDW ATCT. Controllers in a TRACON use short-range radar to identify, track, and provide separation for aircraft out to an approximate distance of 50 nautical miles (NM)¹⁴ from the airport. FAA divides

¹⁰ *U.S. Code*, Title 49, sec. 40101(d)4.

¹¹ Instrument Flight Rules (IFR) is a set of regulations and procedures for flying aircraft when separation from other aircraft and terrain is maintained with reference to aircraft instruments and ATC radar. It is an alternative to Visual Flight Rules (VFR), where the pilot has the responsibility to navigate, and in some cases provide their own separation from other aircraft, by visual means. All commercial air carrier aircraft are required to operate under IFR.

¹² FAA JO 7400.9W, "Airspace Designations and Reporting Points," August 8, 2012.

¹³ Terminal Radar Approach Control (TRACON): A terminal ATC facility that uses radar and non-radar capabilities to provide approach control services to aircraft arriving, departing, or transiting airspace controlled by the facility. (FAA, "Pilot/Controller Glossary," July 26, 2012; from definition of "Radar Approach Control Facility" (a) 4.)

¹⁴ 6,080 ft., as opposed to a statute mile whose length is 5,280 ft.

airspace assigned to a TRACON into sectors.¹⁵ A controller, or team of controllers, manages the safe, orderly, and expeditious flow of air traffic within the sector. As aircraft move through the TRACON-controlled airspace, controllers transfer management and “hand-off” the aircraft to a controller in the subsequent sector. Inside the TRACON (i.e., “terminal”) airspace, FAA typically requires separation of three NM lateral or 1,000 ft. vertical between aircraft.¹⁶

As the aircraft moves further from the airport and climbs to higher cruising altitudes, control is passed to an Air Route Traffic Control Center (ARTCC),¹⁷ a much larger airspace than a TRACON. Controllers in an ARTCC (i.e., Centers) use long-range radar to identify, track, and provide separation for aircraft. Within ARTCC, or “en route,” airspace, FAA typically requires a larger lateral separation of five NM. In areas without proximity to an ATCT or TRACON, the Center also assumes responsibilities that otherwise would be designated to airport and terminal area controllers.

As the aircraft continues towards its destination, control is typically transferred to successive Centers along the flight route, and then back to a TRACON and ATCT as the aircraft approaches its destination airport.

1.3.2 Next Generation Air Transportation System (NextGen)

NextGen is the FAA’s plan to modernize the NAS through 2025.¹⁸ Through NextGen, the FAA is addressing the impact of air traffic growth by increasing NAS capacity and efficiency while simultaneously improving safety, reducing environmental impacts, and increasing user access to the NAS. To achieve its NextGen goals, the FAA is leveraging innovations in aerospace technology that have enabled significant improvements to the equipment and procedures used by ATC and aircraft.

A primary component of NextGen is the evolution from a ground-based ATC system to a satellite-based system that uses *Performance-Based Navigation (PBN)* technologies and advanced procedures. PBN is a framework for defining performance requirements in “navigation specifications.” The PBN framework applies to the development of air traffic routes, instrument procedures, or defined airspace. PBN provides a basis for the design and implementation of automated navigation along flight paths, as well as for airspace design and obstacle clearance. Once the required performance level is established, the aircraft’s own capability determines whether it can safely achieve a specified performance level and qualify for an operation.

The two main components of PBN framework are *Area Navigation (RNAV)* and *Required Navigation Performance (RNP)*. RNAV enables aircraft to fly on any desired flight path within the coverage of ground- and/or space-based navigation aids. Without it, aircraft have to navigate from one ground-based navigational aid (NAVAID) to another, often flying significant distances outside of a direct path to their destination. RNAV procedures are typically used to

¹⁵ A “sector” is a portion of airspace having defined geographic and altitude boundaries.

¹⁶ FAA, “Aeronautical Information Manual,” Chg. 1, Ch. 4, July 26, 2012.

¹⁷ Air Route Traffic Control Center (ARTCC): A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. (FAA “Pilot/Controller Glossary,” July 26, 2012.)

¹⁸ FAA, “Fact Sheet – NextGen Goal: Performance-Based Navigation,” March 2010:

http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=10856.

provide terminal-area arrival procedures and instrument departure procedures.¹⁹ While RNAV paths are typically limited to straight lines, they represent an improvement over conventional, ground-based navigation in the sense that they allow an aircraft to fly a direct, straight route. An RNAV approach is the simplest type of PBN procedure, offers precision-like landing approach procedures without the need for traditional ground radio-navigation infrastructure while also providing a back-up system for existing ground-based navigation procedures.

RNP is a method of aircraft navigation that utilizes modern flight computers, RNAV (of which GPS is one form), and innovative new procedures to fly with greater precision along predetermined paths programmed into aircraft computers. Aircraft Flight Management Systems (FMS)²⁰ ensure accurate navigation performance through their ability to monitor the aircraft's performance and inform the crew if the requirement is not met during an operation. This onboard monitoring and alerting capability enhances the pilot's situational awareness and can enable reduced obstacle clearance or closer route spacing without ATC intervention. RNP is increasingly used for airport arrival and departure procedures that reduce flight distances and reduce thrust settings, with fuel cost savings. RNP also can facilitate noise and emissions reductions, benefiting airport neighbors and the environment. The accuracy and all-weather capability of RNP creates flight safety benefits as well.²¹ However, it is important to note that many aircraft are not equipped to take advantage of RNP. Each operator assesses the costs of equipping aircraft and certifying crew to this emerging standard and compares it to the degree of capabilities gained and likelihood of needing those at a particular airport.

The proposed route and procedure changes at MDW, examined for this EA, would leverage RNAV and RNP technologies, helping to achieve the FAA's NextGen goals.

1.4 DOCUMENT CONTENT AND ORGANIZATION

The format and content of this EA conforms to the requirements for an EA established in the CEQ regulations that implement the procedural provisions of NEPA and with the requirements of FAA Order 1050.1E. Listed below is a summary of the contents of each section of this document:

1. **Introduction:** Provides a description of the EA process, the Proposed Action, and relevant background information.
2. **Purpose and Need:** Provides a description of the purpose of the Proposed Action and why it is needed.
3. **Alternatives:** Provides a discussion of reasonable alternatives analyzed as part of the environmental process, including a discussion of the criteria for evaluation, identification of alternatives eliminated from further consideration, and a comparison of the environmental effects of the alternatives evaluated in detail in Section 5.0, Environmental Consequences.

¹⁹ FAA, "Fact Sheet – NextGen Goal: Performance-Based Navigation," March 2010:
http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=10856.

²⁰ Flight Management System (FMS): An FMS is an integrated suite of sensors, receivers, and computers, coupled with a navigation database. These systems generally provide performance and RNAV guidance to displays and automatic flight control systems. (FAA, "Aeronautical Information Manual," Chg. 1, sec. 1-2-1b.4., July 26, 2012.)

²¹ FAA, "Fact Sheet – NextGen Goal: Performance-Based Navigation," March 2010:
http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=10856.

4. **Affected Environment:** Provides a discussion of existing environmental conditions of the potentially affected geographic area.
5. **Environmental Consequences:** Provides a comparative discussion of the potential environmental impacts associated with the reasonable alternatives identified in Section 3.0, Alternatives, including the No-Action Alternative.

Appendix A: List of Acronyms and Glossary of Terms

Appendix B: References

Appendix C: List of Preparers

Appendix D: Air Traffic Procedures

Appendix E: Aircraft Noise Analysis

E.1 Basics of Noise

E.2 Noise Modeling Technical Report

Appendix F: Inventory of Potential Department of Transportation Act, Section 4(f) Resources and Noise Exposure

Appendix G: Inventory of Historic Resources and Noise Exposure

Appendix H: Coordination and Consultation

H.1 Letters to Government Agencies, and Elected Officials

H.2 Public Notices

H.3 Responses and Comments

2 PURPOSE AND NEED

CEQ regulations for implementing NEPA require that environmental assessments include a “brief discussion of the need” for a Proposed Action.²² Additionally, FAA Order 1050.1E states that an EA must include a discussion that “identifies the problem facing the proponent (that is, the need for an action), the purpose of the action (that is, the proposed solution to the problem), and the proposed timeframe for implementing the action.”²³ An EA must then consider potential Alternatives based on their respective abilities to meet the Purpose and Need of the Proposed Action. This chapter presents the Purpose and Need for the Proposed Action of implementing new or revised air traffic procedures at Chicago Midway International Airport. Chapter 3 describes the alternatives for meeting the Purpose and Need.

2.1 NEED FOR THE PROPOSED ACTION

MDW faces a need for improved efficiency due to constraints of conventional procedures, designed for a ground based navigation system, in addition to the existing airport layout with its intersecting runways. MDW’s proximity to ORD compounds these constraints. RNAV (including RNP in some instances), standard instrument approach procedures (SIAPs),²⁴ and RNAV standard terminal arrival (STAR)²⁵ procedures that employ satellite-based navigation would enable more precise routing of air traffic, improving throughput and flexibility. Due to the high number of RNAV- and RNP-capable aircraft using MDW, increased use of NextGen procedures would improve operations at the airport, but procedures must be retained to preserve the capabilities of non-RNP capable aircraft, including those operated by scheduled air carriers and general aviation (GA)²⁶ operators.

To illustrate a type of problem found at MDW, when winds favor the use of Runway 22L for arrivals during periods of low cloud ceilings, existing, non-precision instrument approach procedures to Runway 22L create bottlenecks. Aircraft often approach the airfield aligned with other runways because the existing RNAV (GPS)²⁷ 22L approach procedure has a relatively high minimum descent altitude and conflicts with traffic at ORD. In order to descend low enough to visually acquire the runway in order to land (i.e., under the clouds), pilots often require approaches with vertical guidance, such as that provided by an Instrument Landing System (ILS);²⁸ however, the existing RNAV (GPS) 22L procedure does not provide vertical

²² *Code of Federal Regulations*, Title 40, Part 1500.

²³ FAA Order 1050.1E, Chg. 1, sec. 405c.

²⁴ Standard Instrument Approach Procedure (SIAP): A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority. (FAA, “Pilot/Controller Glossary,” July 26, 2012.)

²⁵ Standard Terminal Arrival (STAR): A preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area. (FAA, “Pilot/Controller Glossary,” July 26, 2012.)

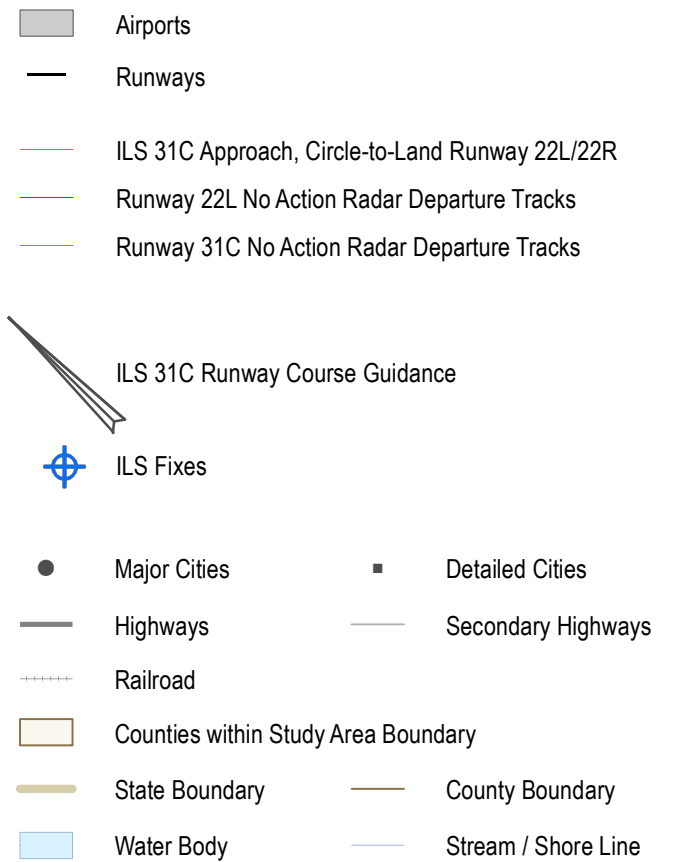
²⁶ General Aviation (GA): That portion of civil aviation that encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessity from the Civil Aeronautics Board and large aircraft commercial operators. (FAA, “Pilot/Controller Glossary,” July 26, 2012.)

²⁷ RNAV (GPS): A Standard Instrument Approach Procedure (SIAP) that employs Area Navigation (RNAV) with the Global Positioning System (GPS) as its source of navigational guidance. GPS is a space-based radio positioning, navigation, and time-transfer system. (FAA, “Pilot/Controller Glossary,” July 26, 2012.)

²⁸ Instrument Landing System (ILS): A precision instrument approach system that consists of electronic components and visual aids. (FAA, “Pilot/Controller Glossary,” July 26, 2012.) The individual components of ILS

guidance. The current practice requires aircraft to follow an instrument approach aligned with one runway, and then to land on another runway (i.e., a “circling” approach), which requires a higher minimum descent altitude for safety reasons. Figure 4 illustrates an example of this maneuver, in this case an ILS 31C “circle-to-land” approach to Runway 22L/R.

may vary by airport. The ILS to Runways 4R, 13C, or 31C at MDW include the following: a) Localizer (i.e., LOC; provides lateral course guidance to the runway); b) Glideslope (provides vertical course guidance for aircraft during approach and landing); c) Distance Measuring Equipment (DME; provides a distance from a point on the airport to a location, or “fix,” on the LOC path; and approach lighting. Runways 13C and 31C have Lead-In (LDIN) lights (several lights along the extended centerline of the runway); Runway 31C also has Runway End Identifier Lights (REILs; strobe lights located at the approach end of the runway). Runway 4R has REILs but does not have LDIN lighting.



MDW - Chicago Midway International Airport
 GYY - Gary/Chicago International Airport

ILS 31C Approach, Circle-to-Land Runway 22L/22R



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The presence of obstructions or tall structures often will require a non-standard design (e.g., an offset final approach course that is not aligned with the runway centerline). Consequently, the offset final approach course results in a higher minimum descent altitude than would otherwise be available from an ILS aligned with the extended runway centerline. Due to the Willis Tower, a conventional ILS approach to Runway 22L at MDW has not been possible. The current VOR/DME RNAV or GPS 22L SIAP has a final approach course that is offset 9° south of the extended runway centerline. In contrast, Runways 4R, 13C, and 31C are served by an ILS, which allows for lower minimum descent altitudes, making them more useful during periods of adverse weather.

It is now possible to design and publish a RNAV (RNP)²⁹ approach procedure to Runway 22L that would allow for a straight-in (i.e., non-offset) final approach course as well as provide vertical guidance, enabling aircraft to descend to a lower minimum descent altitude than the existing VOR/DME RNAV³⁰ or GPS 22L procedure. This would also eliminate the “circling” required when aircraft rely upon the navigational course guidance from an ILS serving one runway to descend below the cloud ceiling but have to circle to another runway end in order to land into the wind. During adverse weather conditions, this would be more efficient than either the existing VOR/DME RNAV or GPS 22L procedure, or the “circling” approach.

In addition to improvements that could be gained by lower descent altitudes, development of a SIAP to Runway 22L that does not rely upon the ILS 31C navigational signal and the subsequent “circling” maneuver would improve operational efficiency at MDW. Currently, when aircraft descend via the ILS 31C approach (using its positive course guidance) and “circle” toward Runway 22L for arrival (as described above), Runway 13C cannot be used for departures because Runway 22L arrival aircraft would be on a converging course with Runway 13C departure aircraft.

The departure headings routinely assigned to aircraft operating from MDW reflect the constraints to Runway 22L arrivals described above. When weather conditions require landing on Runway 22L, aircraft execute an ILS approach to Runway 31C and circle for landing on Runway 22L. This arrival configuration requires traffic to depart Runways 22 and 31 and execute a right turn after departure. This direction of departure creates issues with ORD arrival/departure traffic and obstruction issues with the Willis Tower. It has long been desired to find an approach to Runway 22 in order to allow left hand turns for departures to the south off MDW, as opposed to the right hand turns to the north. The advent of RNAV and RNP procedures has allowed FAA to develop a straight-in approach to Runway 22.

To accommodate the proposed RNAV (RNP) and RNAV (GPS) approaches to Runway 22L, the initial departure headings (or vectors) assigned to aircraft when using the existing standard instrument departures (SIDs)³¹ (CICERO FIVE and MIDWAY EIGHT) would need to be

²⁹ RNAV (RNP): A Standard Instrument Approach Procedure (SIAP) that employs Area Navigation (RNAV) with RNP monitoring that provides vertical guidance in addition to lateral course guidance. The course guidance may be derived from ground transmitters (e.g., VOR or DME), satellite transmitters, or inertial navigation sensors.

³⁰ VOR/DME RNAV: A Standard Instrument Approach Procedure (SIAP) that employs Area Navigation using a combination of VHF Omni-directional Range (VOR) and Distance Measuring Equipment (DME) ground stations for navigational course guidance.

³¹ Standard Instrument Departure (SID): A preplanned instrument flight rule (IFR) air traffic control (ATC) departure procedure printed for pilot/controller use in graphic form to provide obstacle clearance and a transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement to

modified. Currently, when MDW arrival traffic is landing on Runway 4R, the departures from Runway 31L/C/R headed toward eastbound or southbound destinations are vectored via a clockwise turn, overflying the area north of MDW. When MDW arrival traffic is descending along the localizer course to Runway 31C with a circling approach to 22L, the southbound departures from Runways 22L/22R and 31L/C/R make counter-clockwise turns overflying the area west of MDW while the eastbound departures make clockwise turns overflying the area north of MDW. Similarly, Runway 22L departures with eastbound destinations would need to be vectored via a counter-clockwise turn, southward along the south side of MDW, rather than the current clockwise turn after takeoff. New departure heading assignments would also need to be developed for Runway 13C. Radar track data for aircraft departing from Runways 22L, 22R, 31L, 31C, and 31R using the existing departure heading assignments are shown on Figure 4 (above). Section 3.2.2.1 provides further details and a graphical depiction of the proposed changes to existing departure headings.

Moreover, the existing set of STARs leading to MDW was designed using older design concepts that predate current RNP and PBN capabilities. Existing STARs end approximately 30 mi. from MDW, after which ATC employs radar vectoring to align arrival aircraft onto the final approach course for the runways currently in use. In contrast, RNAV STARs can be designed to terminate on a downwind leg, parallel to the landing runway, or at the point where an RNP-AR SIAP begins. New RNAV STARs (e.g., for arrivals from the southwest, west, or east) or revisions to existing RNAV STARs (e.g., for arrivals from the south and southeast) must be implemented in order to resolve this discrepancy, thus facilitating direct connectivity of STARs and SIAPs without reliance upon radar vectoring. With new or revised RNAV STARs, it would be possible to create defined pathways that tie into the final approach courses for Runways 4L/R, 13L/C/R, and 22L/R, without significant reliance on radar vectoring. In contrast, existing STARs contain segments that increase miles flown, increase required pilot/controller voice communications, and result in less predictable, repeatable flight paths. RNAV STARs would resolve these issues.

2.2 PURPOSE

The Purpose of the Proposed Action for MDW is to accommodate current and future air traffic more efficiently by designing and implementing RNAV air traffic procedures, specifically RNP SIAPs to each primary runway end, as well as RNAV SIDs and STARs leading to and connecting with the beginning of the RNP SIAPs. These new procedures would leverage NextGen avionics technology that has been widely adopted by airspace users in recent years. Use of RNAV/RNP would enable the FAA to overcome constraints inherent in conventionally designed procedures that rely upon a ground based navigational system. To illustrate one such constraint, the presence of the Willis Tower prevents design and use of a SIAP for Runway 22L that would have low minimum descent altitudes if that SIAP was predicated on either ground-based NAVAIDs or RNAV without the precision, accuracy, and monitoring components inherent in RNP and PBN. Such approaches do exist for the other primary runways (4R, 13C, 31C). The advent of RNP with an ability to design curved pathways would allow design and

expedite traffic flow and to reduce pilot/controller workload. ATC clearance must always be received prior to flying a SID. (FAA, “Pilot/Controller Glossary,” July 26, 2012.)

implementation of a procedure that avoids existing obstacles while still achieving the capabilities (i.e., lower minimum descent altitudes) of an ILS.

2.3 DESCRIPTION OF PROPOSED ACTION

The Proposed Action evaluated in this EA is the implementation of new initial departure headings off MDW to the existing SIDs, and new RNAV arrival procedures (inclusive of RNP), in order to help improve overall efficiency at MDW. RNAV/RNP capable aircraft would use the new RNAV and RNP procedures. Additionally, existing procedures would be retained for non-RNAV/RNP capable aircraft.

The Proposed Action would change aircraft flight paths and profiles (e.g., elevations) over the ground but would not require any new infrastructure. It would not result in an increase in the number of aircraft operations at MDW beyond forecast levels based on market demand for air travel, nor would it change any class or category of aircraft using the airport. It would not include any physical changes or development of facilities, nor would it require local or state actions. Therefore, no physical alteration to any environmental resource would occur. Additionally, it would not require changes to the Airport Layout Plan.

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3 ALTERNATIVES

This chapter describes the alternatives considered for the Chicago Midway EA – the Proposed Action and the No Action Alternative. As described in Chapter 2, *Purpose and Need*, the Proposed Action would implement procedural changes to benefit operations at MDW, which would consist of additional or modified air traffic procedures that would enable predictable and repeatable flight paths, reduce pilot and controller communication, and increase efficiency. Specifically, the FAA proposes to publish and implement new or modified RNAV SIDs, RNAV STARs, and RNAV SIAPs for MDW, as well as changes to departure headings.

FAA NEPA guidance states, “An EA must consider the proposed action and a discussion of the consequences of taking no action, and may limit the range of alternatives to action and no action when there are no unresolved conflicts concerning alternative uses of available resources.”³² CEQ regulations require consideration of a No Action Alternative as a basis for comparative analysis of potential environmental consequences that would occur with implementation of the Proposed Action.³³

3.1 IDENTIFICATION AND EVALUATION OF POTENTIAL ALTERNATIVES

As described in Chapters 1 and 2, the airspace in the Chicago area near MDW is operationally complex, and procedure changes that may be beneficial for one aspect of operations (e.g., arrivals), geographical area (e.g., SW corner-post area), or airport (e.g., MDW) may affect operations in the region as a whole. Due to this complexity, the FAA must evaluate proposed changes to air traffic procedures in terms of their potential effects on the existing set of all air traffic procedures. Therefore, the FAA used an iterative process, spanning several months, to analyze all current procedure designs for MDW and develop potential solutions as part of the Proposed Action, which were then evaluated to assure that implementation would achieve overall improvement of MDW operations. During this process, (1) deficiencies and opportunities for procedural improvement were identified; (2) proposed changes were designed; and (3) those proposed changes were further tested and refined, then recommended or rejected based on their ability to meet the Purpose and Need as described in Chapter 2.

Collectively, the Proposed Action was developed as a final set of eleven (11) new or revised air traffic procedures, along with revisions to departure headings, and one decommissioned procedure that would be replaced by a new procedure. Appendix D, *Air Traffic Procedures*, presents detailed information on each of the proposed procedures, including comparisons to the No Action Alternative, and specific issues that each was designed to address.

3.1.1 Procedure Design Working Group

Representatives from FAA Air Traffic facilities in the area (including ZAU ARTCC, C90 TRACON, and MDW ATCT), the FAA Chicago Airports District Office (ADO), the FAA Central Service Center (CSC) Operations Support Group, FAA environmental analysis support contractors (including Harris Miller Miller & Hanson Inc.), the City of Chicago Department of Aviation (CDA), and industry all collaboratively examined the set of existing procedures, evaluated potential opportunities for improvement, and recommended new or modified designs.

³² FAA Order 1050.1E, Chg. 1, sec. 405(d)

³³ *Code of Federal Regulations*, Title 40, sec. 1508.25(b)(1)

3.2 ALTERNATIVES RECEIVING FURTHER CONSIDERATION

This section relates the Proposed Action and No Action Alternative to the Purpose and Need.

3.2.1 No Action Alternative

Under the No Action alternative, the FAA would maintain existing air traffic procedures in use at MDW. However, this alternative may include any future actions that have yet to be identified, which would be independent of the Proposed Action.

Under the No Action Alternative, the specific new or modified RNAV STARs, ILS, RNP or GPS SIAPs, and changes to departure headings, all designed as part of the Proposed Action, would not be implemented, published, or used. The following subsections describe aspects of current operations that would continue in the absence of the Proposed Action and are, therefore, included in the No Action Alternative: (1) runway use and operational flow, (2) noise abatement flight procedures, (3) corner post airspace design, and (4) air traffic operations.

3.2.1.1 Runway Use and Operational Flow

“Operational flow” refers to the configuration of runways that are in use at any given time at an airport. Winds and the presence of other air traffic in the region influence the operational flow more commonly than the ultimate destination of an aircraft. The MDW runway complex consists of a set of two parallel NE/SW runways perpendicular to a set of three parallel NW/SE runways. Typically, the predominant influence on the operational flow at MDW is the operational flow occurring at ORD some 13.5 NM to the north-northeast, where operations at ORD land from the southeast and takeoff to the northwest (i.e., “northwest flow”). By comparison, a “southeast flow” indicates that landings and takeoffs are occurring from northwest to southeast. When Runway 10C/28C is commissioned, ORD will transition to an east/west flow where operations would land from the east and takeoff toward the west (i.e., west flow). By comparison, an “east flow” indicates that landings and takeoffs are occurring from west to east.

Figure 5 illustrates the runway geometry at MDW and a landing runway configuration in a west flow. In this example for the month of December 2009, arrivals were occurring to the NW on Runway 31C (61% of operations) and departures were occurring to the SW on intersecting Runway 22L (11% of operations). Given the number of runways at MDW, a wide variety of runway use permutations is possible for both arrivals and departures.³⁴

³⁴ For a detailed description of operations at MDW, refer to the MDW Noise Office runway usage data, reported quarterly by the City of Chicago Department of Aviation (CDA):

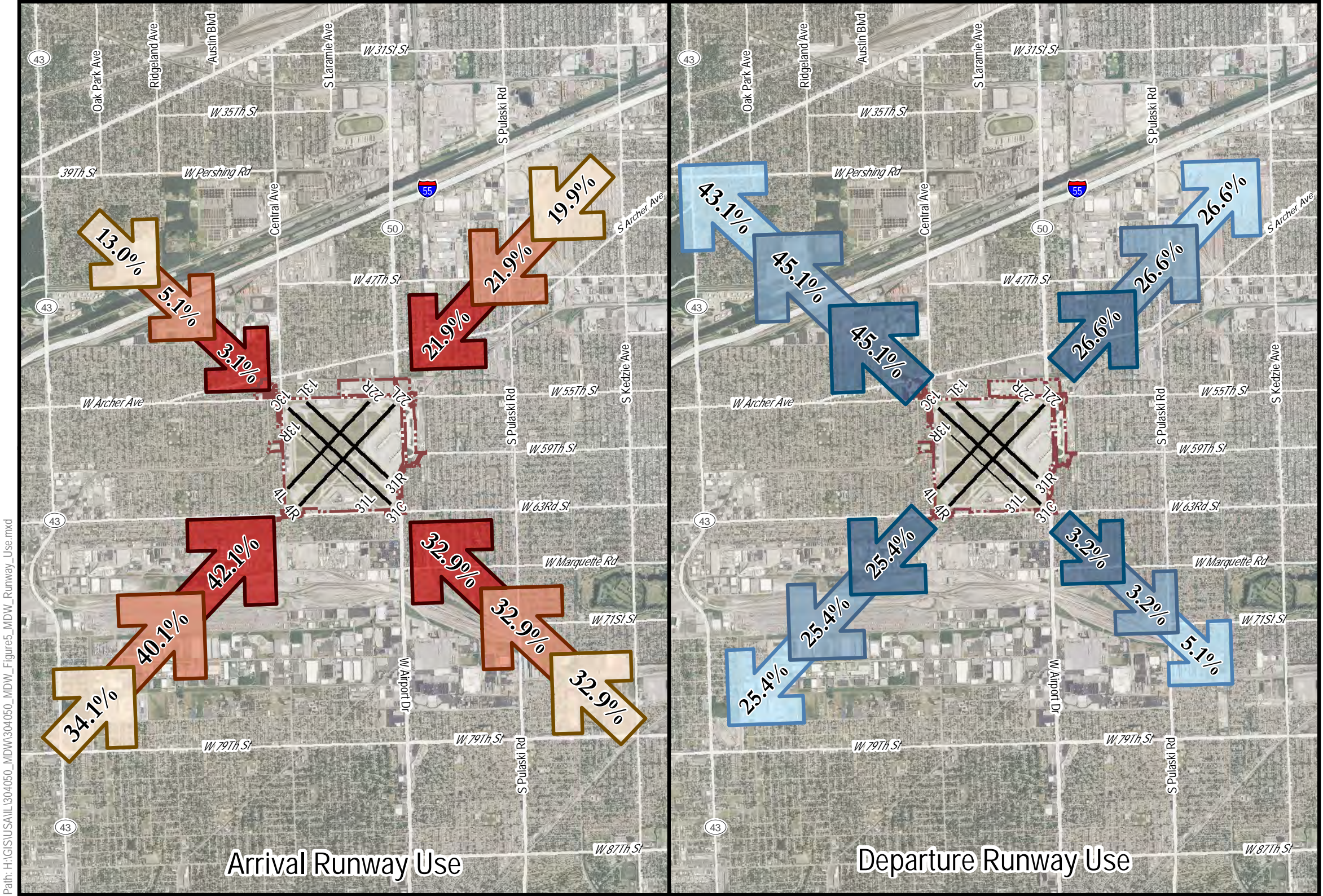
<http://www.flychicago.com/midway/en/AboutUs/Community/NoiseManagement/default.aspx>

Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Approximate Airport Boundary
- Airport Runway
- 2011 Base Year Arrival Runway Use
- 2013 First Year (No Action) Arrival Runway Use
- 2018 Future Year (No Action) Arrival Runway Use
- 2011 Base Year Departure Runway Use
- 2013 First Year (No Action) Departure Runway Use
- 2018 Future Year (No Action) Departure Runway Use
- Highways
- Secondary Highways



Path: H:\GIS\USAIL\304050_MDW\Figure5_MDW_Runway_Use.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (Roads), March 14, 2012; Unites States Department of Agriculture (USDA), (Aerial Photography - NAIP), January 23, 2013
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

Figure 5

Sample Runway Use (Arrival) Scenario at MDW



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Operational flows are established so that aircraft generally take off and land in the same direction, increasing safety and maximizing use of existing capacity. Parallel runways further enhance capacity, such as those used at MDW. However, not all runways at MDW are suitable for larger aircraft. Therefore, a common way of increasing the utility of the runway complex is to direct arrivals toward one runway and departures from an intersecting runway. This allows departure aircraft to queue and wait until arrival aircraft on the intersecting runway have landed, saving time compared to sharing a single runway for both types of operations.

Factors other than the physical orientation of runways also influence operational flows. Aircraft generally take off and land into the wind for safety reasons, so the use of certain runways is generally determined by prevailing wind conditions. Moreover, runway use is also determined by weather (e.g., cloud ceilings and visibility), operational efficiency, runway capabilities (e.g., length, width and load-bearing capacity), and other specific airport requirements (e.g., operations, nighttime noise, and maintenance).

Given the proximity of MDW and ORD, operational flow at each airport can influence the flow at the other. Indeed, in the context of the entire C90 TRACON airspace, the ORD operational flow generally dictates flows throughout the region because of its high volume of arrival and departure operations.

In general, MDW is configured with departures from one runway and arrivals to an intersecting perpendicular runway, maximizing throughput and minimizing taxi and engine idle time. Arrivals seldom use Runway 13C (landing to the SE) during peak traffic periods because, for conventionally equipped aircraft, its instrument final approach course would extend into airspace routinely used by ORD operations. Similarly, departures off the reciprocal Runway 31C (taking off to the NW) must turn soon after takeoff to avoid the same conflict. According to runway usage data over the course of one year, arrivals use 31L/31C/31R approximately 50 percent of the time; departures use 31L/31C/31R approximately 50 percent of the time, and 22L/22R (taking off to the SW) approximately 25 percent of the time. The balance is comprised of many permutations of intersecting and single-runway usage.³⁵

3.2.1.2 Noise Abatement Procedures

Chicago Midway International Airport employs a long-standing noise abatement program that influences air traffic procedure design, including the following examples of noise abatement flight procedures:³⁶

- All departures are required to expedite climb through 1500 ft. above mean sea level (MSL) between 10PM and 6AM daily
- Runway 22L is the preferred departure runway between 10PM and 7AM daily
- Runway 13R/31L is restricted to GA aircraft weighing less than 12,500 lbs.

³⁵ CDA, “Runway Use Report,” December 2009:

<http://www.flychicago.com/midway/en/AboutUs/Community/NoiseManagement/NMS/Runway-Use-Report.aspx#>

³⁶ CDA, “Chicago Midway International Airport – FAR Part 150 Noise Compatibility Study Update – Draft,” February 2013.

3.2.1.3 Corner-Post Airspace Design

The existing airspace structure in place in the Chicago region – at ORD, MDW, and other satellite airports – uses SIDs and STARs, relying on a system of fixes, routes, and procedures to direct aircraft through C90 TRACON airspace. The overall layout is known as a “corner-post” structure because arrival streams enter C90 TRACON airspace through the corners (NE, SE, SW, NW) and departures streams are routed to leave through the sides (N, E, S, W). With respect to MDW operations, this concept is modified so that MDW arrivals generally only enter through the SE and SW corners, and MDW departures generally do not exit C90 TRACON airspace to the north, in order to avoid traffic conflicts with ORD traffic. To facilitate this structure, specific NAVAIDs and navigational fixes are established along the C90/ ZAU boundary. For arrivals through the corners, these fixes are called “arrival metering fixes”; for departures between the corners, these fixes are called “departure gate fixes.”

Figure 6 illustrates in very general terms the corner-post concept as used in the Chicago region, as well as the general location of MDW and ORD. To manage air traffic in C90 airspace and to segregate MDW arrival and departure streams from each other, arrivals are routed through one of two terminal area airspace corners (depicted by red arrows in Figure 6); departures are routed between the corners (with the previously noted exception of avoiding the northern C90/ZAU boundary to avoid ORD traffic), over one of several departure gate fixes situated between two corner-posts (as depicted by blue arrows in Figure 6).

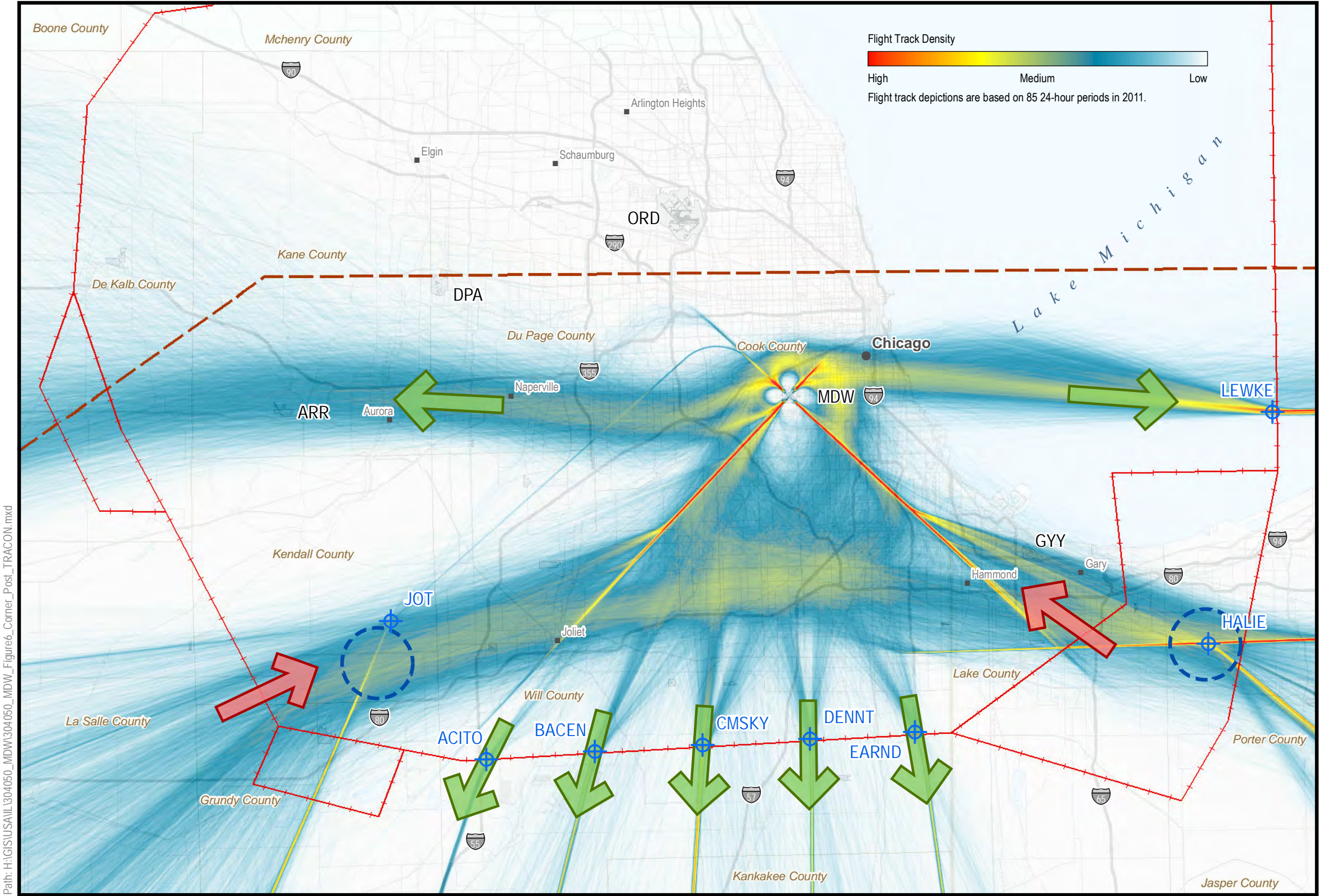
Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports
- Runways
- C90 TRACON Boundary
- Arrival Corridor
- Departure Corridor
- Corner-Post
- Corner-Post Fixes
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Railroad
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport



Path: H:\GIS\US\AIL\304050_MDW\Figure6_MDW_Corner_Post_TRACON.mxd

Data Source: FAA (TRACON Boundary), February 26, 2013; Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Railroad), February 10, 2013; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

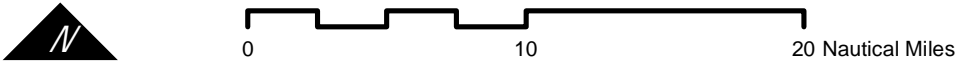


Figure 6
Existing Corner-Post Design for C90 TRACON

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3.2.1.4 Air Traffic Operations

This section presents an overview of the SIDs and STARs serving MDW under the No Action Alternative.³⁷ Currently, three arrival procedures serve MDW arrivals (FISSK ONE RNAV STAR, GOSHEN FIVE conventional STAR, and MOTIF FOUR conventional STAR). Two procedures route aircraft into the C90 airspace from over the SE corner and one (MOTIF FOUR) routes aircraft over the SW corner.

Also currently, two conventional SIDs serve MDW departures (CICERO FIVE and MIDWAY EIGHT). Both rely on an initial runway heading immediately after takeoff, followed by a subsequent turn to a predetermined heading (i.e., vector) when the aircraft is high enough to turn safely, followed by radar vectoring toward a departure gate fix. For example, when departing Runway 31C, aircraft destined toward the east departure gate fixes maintain runway heading (315°) initially, then subsequently turn right (clockwise) to a heading of 090° as soon it is safe to do so, in order to avoid ORD traffic flows. Aircraft heading toward a west or south departure gate off the same runway would turn left (counterclockwise) to a heading of 250° for a west departure gate or to either of a 200° or 170° heading if headed toward a south departure gate. Departures with destinations to the north would be routed through either the west or east gates depending upon the operational flow condition at ORD, using the headings described above for those gates. It is important to note that these headings are general in nature and can vary depending upon a meteorological and operational factors present at any given time. In addition, the following RNAV SIDs were published in January: ADELL ONE (RNAV), BLOKR ONE (RNAV), CARYN ONE (RNAV), DARCY ONE (RNAV), and ELANR (ONE). However, use of these SIDs is not yet authorized and a Notice to Airmen (NOTAM) has been issued reflecting this status. These SIDs follow existing departure tracks. In addition, MDW uses four precision and eight non-precision SIAPs to eight of the ten runway ends. A precision approach provides both lateral and vertical path course guidance (i.e., glideslope) and normally would offer lower decision altitudes than is provided by a non-precision approach that only offers lateral course guidance. In contrast, a non-precision approach only offers lateral course guidance. The GA runway 13R/31L does not have a published SIAP.³⁸

Ordinarily a SIAP terminates in a straight-in landing. However, unless otherwise prohibited because of obstructions or other factors, aircraft may also descend along a final approach course to one runway and perform a “side-step” maneuver to a parallel runway, or alternatively perform a “circle-to-land” maneuver to land on an intersecting or reciprocal runway. These are visual maneuvers that may occur once ground reference has been acquired from either a precision or a non-precision approach. At MDW, the “circle-to-land” maneuver would occur if SW winds favor use of Runway 22L but low cloud ceilings require use of a SIAP to descend below a cloud ceiling. A conventionally equipped (i.e., non-RNAV) aircraft would not be able to use the existing VOR/DME RNAV or RNAV (GPS) Runway 22L approach and would, therefore, descend via the non-precision ILS Runway 31C approach to 560 ft. AGL and then circle to land

³⁷ For additional details regarding current MDW operations in C90 airspace, reference Appendix D for air traffic procedures.

³⁸ The ADELL ONE (RNAV), BLOKR ONE (RNAV), CARYN ONE (RNAV), DARCY ONE (RNAV), and ELANR ONE (RNAV) SIDs were published during the same publication and automation update cycle as certain SIDs serving ORD. The entire package of SIDs require revision for coding and automation issues which results in an inability to authorize use of the MDW RNAV SIDs at this time. As FAA and industry analyze these issues, minor revisions may be made. FAA will conduct the appropriate level of environmental review.

on 22L (as illustrated in Section 2.1, Figure 4). A “circle-to-land” approach would constitute a less direct runway approach with higher minimum altitude requirements than would be provided by a stabilized, straight-in approach, followed by a landing, without reliance upon a “side step” or “circle-to-land” maneuver. A straight-in approach to Runway 22 allows left hand turns for departures to the south off MDW, as opposed to right hand turns to the north.

At MDW, precision approaches with lateral and vertical navigational guidance provided by ILS serve Runways 4R (landing NE), 13C (landing SE), and 31C (landing NW). However, the ILS to Runway 13C is seldom used because its approach course extends in a straight line NW nearly 10 NM, conflicting with ORD traffic flows as noted previously. Additionally, a RNAV (RNP) SIAP is published for Runway 13C, designed to avoid conflicts with ORD traffic flows.

3.2.2 Proposed Action

The Proposed Action consists of eleven (11) new or revised air traffic procedures, along with revisions to departure headings, and one decommissioned procedure that would be replaced by a new procedure. Changes proposed as part of the Proposed Action would achieve the following objectives:

- Accommodate current and future air traffic more efficiently by implementing RNAV/RNP air traffic procedures
- Leverage NextGen avionics technology that has been widely adopted by airspace users in recent years
- Enable the FAA to overcome constraints inherent in conventionally designed procedures that rely upon a ground-based navigational system, while retaining capabilities for conventionally (i.e., non-RNAV) equipped aircraft

New RNAV/RNP procedures would also provide vertical navigation, allowing aircraft to descend from cruise altitude into the airport area with reduced pilot-controller communication and fewer inefficient level flight segments. In addition, flight profiles (e.g., fixes, flight paths, altitudes, and airspeeds) would be altered to streamline the delivery of aircraft to or from the runways. The target date for publication of the proposed MDW procedures is June 27, 2013. See Appendix D for more information about the Proposed Action procedures.

Implementation of the Proposed Action would not require any ground disturbance, development of facilities. No physical alteration to any environmental resource would occur. Furthermore, the Proposed Action would not increase the number of aircraft operations or result in any new class or category of aircraft at the airport within Chicago region airspace or at MDW as compared to the No Action Alternative.

3.2.2.1 Proposed Action Air Traffic Operations

This section presents an overview of the air traffic procedures that would serve MDW under the Proposed Action. The STARs and SIDs are grouped geographically, corresponding to the C90 corner or side, respectively, over which they would cross. The geographical extent of these existing and proposed air traffic procedures does and would continue to extend over 100 NM from MDW. The proposed RNP SIAPs are grouped together because their flight tracks are confined to an area within 15 NM of MDW and do not cross a corner-post or side of the C90 airspace boundary. Instead, their beginning points connect with the end-points of a RNAV STAR.

Proposed Departure Changes: East Side Boundary

Currently, eastbound departures would continue to use the CICERO FIVE or MIDWAY EIGHT SIDs described above. However, immediately after takeoff, upon reaching an altitude that would safely permit it, departures using Runway 31L, 31C, and 31R on an initial runway heading of 315° would turn left (counterclockwise) toward a heading of 200° or 170°. After flying down the west side of the airport and clearing any potentially conflicting MDW arrival or departure streams, the aircraft would subsequently be vectored toward a departure gate fix on the east side of the C90/ZAU boundary. As with the No Action Alternative, the purpose of immediately turning aircraft departing on Runway 31C is to deconflict MDW departures from ORD air traffic. The purpose of turning these aircraft to the left (counterclockwise) instead of the currently used right turn would be to deconflict them from MDW Runway 22L arrivals, using a proposed RNP SIAP (described below) or the proposed RNAV (GPS) to 22L.

Similarly, eastbound departures from Runway 22L and 22R would turn left (counter-clockwise) and fly over the west side of the airport before continuing eastbound. This is in contrast to the current practice of turning right (clockwise) after departure and heading north and then east. The changes to the departure headings described above would only occur when MDW is using the RNAV (RNP) 22L or RNAV (GPS) 22L SIAPs for arrivals. During other landing configurations (i.e., use of the modified ILS 31C, the proposed new RNAV (RNP) 31C, the modified ILS 4R, or the proposed new RNAV (RNP) 4R procedures), aircraft departing from either runway 22L or 31C would turn clockwise to an eastbound 090° heading as they do today.

Proposed Arrival Changes: Southeast Corner

The current GOSHEN FIVE conventional STAR routes arrivals from the east to MDW over the HALIE intersection, an arrival metering fix at the SE corner of the C90 airspace, approximately 30 NM SE of the airport. Aircraft using this STAR depart en route airways at one of two transition points: (1) the Litchfield VOR (LFD), 134 NM east of MDW; or (2) the Fort Wayne VOR (FWA), 125 NM south-southeast of MDW. Under the Proposed Action, this STAR would not change, continuing to route traffic westward after HALIE on a 267° heading toward the Chicago Heights (CGT) VOR, 18 NM west of HALIE and 18 NM south-southeast of MDW, until arrivals are turned off this route and vectored to intercept the final approach course for whatever runway is in use at MDW.

The FAA proposes to publish a new RNAV STAR named PANGG that would be identical to the existing GOSHEN FIVE arrival from the en route transition points until the HALIE waypoint. After HALIE, the proposed RNAV STAR routing would differ from GOSHEN FIVE in that four flow-specific runway transitions would be created, using three branches. The southernmost branch would lie slightly north of the current HALIE to CGT VOR course of the GOSHEN FIVE arrival. These four transitions would queue aircraft for the final approach courses associated with the existing and proposed SIAPs serving 4L, 13C, 22R, and 31C, and are specifically designed to tie into the three proposed and one existing RNP SIAPs. The proposed RNP SIAPs are described separately, below.

The FAA proposes to modify the existing FISSK One RNAV STAR, which carries arrivals from the south and SE toward C90 airspace. Currently, aircraft depart the en route structure at the Kokomo VOR (OKK), a NAVAID that lies 108 NM SE of the airport. This procedure also overflies HALIE waypoint toward CGT. From HALIE to the CGT VOR, this STAR currently has the same course as the current GOSHEN Five arrival. Aircraft continue westward from HALIE and are turned off the procedure at or before CGT for radar vectoring. Under the Proposed

Action, the FISSK ONE RNAV STAR would instead have routing identical to the proposed MOOMO RNAV STAR, described above. Three branches would be developed, from which aircraft could fly to any of the four final approach courses serving Runways 4L, 13C, 22R, or 31C.

Proposed Departure Changes: South Side Boundary

Currently, air traffic destined toward the south would continue to use the CICERO FIVE or MIDWAY EIGHT SIDs described above. However, immediately after takeoff, upon reaching an altitude that would safely permit it, departures using Runway 31L, 31C, or 31R on an initial runway heading of 315° would normally turn left (counterclockwise) toward a heading of either 200° or 170°, depending upon several factors, including direction of intended destination, aircraft capability (e.g., jet versus propeller), and other air traffic in the area. After flying down the west side of the airport and clearing potentially conflicting MDW arrival streams, the aircraft would subsequently be vectored toward a departure gate fix on the south boundary line between C90 and ZAU airspace. The counterclockwise turn is for the same purpose as for departures headed toward the east side boundary, avoiding ORD air traffic and avoiding arrivals landing on Runway 22L.

Proposed Arrival Changes: Southwest Corner

The current MOTIF Four conventional STAR carries traffic arriving from the west to MDW over the MOTIF intersection, an arrival metering fix that lies at the SW corner of the C90 airspace, approximately 47 NM SW of the airport. Aircraft depart the en route airways at one of five transition points, ranging from the Davenport VOR (CVA), approximately 122 NM west of MDW, to the Spinner VOR (SPI), approximately 146 NM SW of MDW. Inside C90 airspace, aircraft using the existing MOTIF FOUR conventional STAR fly north-northeast from a common merge point at the MOTIF intersection, along a 022° heading to the Joliet VOR (JOT), and then are issued radar vectors to the final approach course for the SIAPs that are in use for the landing runways at MDW would be issued. Under the Proposed Action, this STAR would remain as currently published, in order to serve conventionally equipped aircraft arriving over the SW corner of the C90 airspace.

The FAA proposes to publish a new RNAV STAR named ENDEE that would be similar to the existing MOTIF FOUR arrival in that it would provide routing from the west and have five en route transitions. However, these transitions would be considerably closer to MDW and their common merge point at the C90 airspace boundary would differ from the existing MOTIF FOUR STAR. The transitions would merge at a proposed ENDEE waypoint, cross the ZAU/C90 boundary at a proposed STKNY waypoint serving as an arrival metering fix, and then branch into four runway transitions, from which aircraft could fly to any of the four final approach courses serving Runways 4L, 13C, 22R, or 31C.

Proposed Departure Changes: West Side Boundary

Currently, westbound departures would continue to use the CICERO FIVE or MIDWAY EIGHT SIDs described above. When Runway 22L is in use for landings, aircraft turn toward a heading of 250° (clockwise from a 22L departure, counter-clockwise from a 31C departure. No changes to departure headings for aircraft going toward the west side boundary are proposed.

Proposed New RNP Approach Procedures: MDW Runways 4R, 22L, and 31C

The Proposed Action includes changes to instrument procedure design for SIAPs, as well as the corresponding flight operations from MDW that would occur between the ends of RNAV STARs and the initial approach fixes of SIAPs serving MDW. The FAA proposes to implement three new RNP SIAPs to MDW Runways 4R, 22L, and 31C, and to modify the existing RNP SIAP to 13C. The new and revised procedures would tie directly into the modified FISSK ONE RNAV STAR, the new PANGG RNAV STAR, and the new ENDEE RNAV STAR. They would generally overlay the current visual arrival paths and would be an option during Instrument Meteorological Conditions (IMC).³⁹ These procedures would be used by RNP-equipped aircraft and appropriately trained/certified crews. They would be anticipated to change runway usage somewhat as described in Section 3.3.1.2.

For the proposed RNP's to runways 13 C, 4R, and 31C, the RNP's essentially follow ground tracks that occur today for aircraft being vectored to the ILSs. However, for the RNP-AR to 22L this is not the case as existing aircraft on downwind doing the circle to land approach are much closer to the airport than the proposed RNP-AR. Some of these changes will be below 3,000 ft. AGL. The new RNP SIAPs would not always be available for use even when aircraft are properly equipped and flown by appropriately trained and certified crews. There may be circumstances when operational considerations, including traffic saturation during certain peak times and adverse weather conditions, prevent use of the procedures.

Proposed New RNAV Transitions to ILS Approach Procedures: MDW Runways 4R, 13L, and 31C

The existing ILS SIAPs for MDW serving 4R, 13C, and 31C would be modified to add transitions from the proposed RNAV STARs to the initial points on the ILS procedures. As a result, the procedure tracks from the end of the proposed RNAV STARs to the beginning points on the ILS would mirror the procedure tracks for the proposed RNP-AR SIAPs, and would generally correspond to flight tracks currently flown. The primary difference is that today the navigational course guidance is achieved via visual means or a series of radar vectors, whereas under the Proposed Action RNAV transitions would provide positive course guidance.

Proposed New RNAV (GPS) Standard Instrument Approach Procedure: MDW Runway 22L

In conjunction with the other changes described above, the existing VOR/DME RNAV or RNAV (GPS) SIAP would be decommissioned and replaced with a revised RNAV (GPS) SIAP. The principal difference between this and the existing VOR/DME RNAV or RNAV (GPS) is that the initial flight track leading to the final approach course would be shifted slightly southward to avoid obstructions that prevented a lower descent altitude (i.e., Willis Tower). Compared to the proposed RNP-AR SIAP to the same runway, the RNAV (GPS) approach would not have the same curved approach paths, nor would it have as low of a minimum decent altitude. However, compared to the existing VOR/DME RNAV or RNAV (GPS) procedure, the revised RNAV (GPS) procedure would have a lower descent altitude without requiring the specialized equipment and aircrew certification required for the RNP-AR SIAPs. Thus, for the fleet mix of aircraft not

³⁹ Instrument Meteorological Conditions (IMC): Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions. (FAA, "Pilot/Controller Glossary," July 26, 2012.)

equipped for RNP-AR SIAPs, publication of this approach procedure would represent an increase in capability during periods of adverse weather conditions.

3.3 COMPARISON OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the similarities and differences between the Proposed Action and the No Action Alternative, as shown in Table 1. Figures 7 through 9 present comparison illustrations of the current instrument procedures and proposed new or modified procedures. Appendix D provides additional details on the existing and proposed procedures.

3.3.1 Similarities

This section describes the aspects of air traffic management in the Chicago region that would remain constant under the Proposed Action and No Action Alternative.

3.3.1.1 Noise Abatement Procedures

The noise abatement procedures, as described in section 3.2.1.2 would remain the same under both the Proposed Action and No Action Alternative.

3.3.1.2 Runway Configurations and Use

The runway configuration and use, as described in section 3.2.1.3, would be similar under both the Proposed Action and No Action Alternative. However, some changes to runway use would be anticipated as a result of implementing the Proposed Action.⁴⁰

Arrival Runway Use Changes

1. Arrivals to Runway 13C will increase by 2% in the first implementation year (2013) and 10% in the future implementation year (2018). This will cause a 2% decrease in arrivals to Runway 4R in the first implementation year, and an 8% decrease in arrivals to Runway 4R and 2% decrease in arrivals to Runway 22L in the future implementation year.
2. Arrivals to Runway 22L will increase by 5% due to new procedures to Runway 22L. This will cause a 5% decrease in arrivals to Runway 31C.

Departure Runway Use Changes

1. For the Proposed Action, there will be a slight decrease in departures from Runway 31C when arriving to Runway 22L because the new east departure crosses the departure path of the Runway 22L departures. Additionally all south and east departures will cross the arrivals from the west.
2. For both the Proposed Action and the No-Action, there will also be a very small decrease for departures on Runway 31C due to the increased usage of Runway 13C for arrivals. These departures will be shifted to Runway 22L.
3. The cumulative impact of both these changes to runway use will result in:
 - a. No estimated shift in departures for the No Action implementation year, and a 2% estimated shift in the No Action future implementation year;

⁴⁰ HMMH Memorandum, to FAA, “Midway EA Future Runway Use,” July 6, 2012.

- b. A 2% estimated shift in departures for the Proposed Action implementation year, and a 4% estimated shift in the Proposed Action future implementation year.

Runway Use Tables

Changes were applied proportionally across all parallel runways based on the runway use in the Part150 Existing Conditions INM Study.

Table 1 Runway Use for Proposed Action

Runway	Arrivals			Departures		
	Base Year (2011) ¹	First Year (2013)	Future Year (2018)	Base Year (2011) ¹	First Year (2013)	Future Year (2018)
4L	3.1%	3.0%	2.5%	4.4%	4.4%	4.4%
4R	39.0%	37.1%	31.6%	22.2%	22.2%	22.2%
13C	2.9%	4.9%	12.7%	3.0%	4.9%	6.9%
13L	<0.1%	0.1%	0.2%	<0.1%	<0.1%	0.1%
13R	<0.1%	<0.1%	0.1%	<0.1%	<0.1%	<0.1%
22L	19.3%	23.7%	22.0%	22.5%	22.5%	22.5%
22R	2.6%	3.2%	2.9%	2.9%	2.9%	2.9%
31C	29.5%	25.0%	25.0%	42.1%	40.2%	38.3%
31L	2.1%	1.8%	1.8%	2.2%	2.1%	2.0%
31R	1.3%	1.1%	1.1%	0.8%	0.8%	0.7%

Notes:
1. From Part150 INM Study for Existing Conditions.
2. Percentages don't always add up to 100% because of rounding.
Source: HMMH Memorandum to FAA, July 6, 2012.

3.3.1.3 Use of West/East Flow

The operational flows, as described in section 3.2.1.3, would remain the same under both the Proposed Action and No Action Alternative.

3.3.1.4 Unchanged Existing Procedures

A number of existing air traffic procedures would remain unchanged under implementation of the Proposed Action. In particular, the conventional navigation SIDs and STARs, as well as existing SIAPs relying upon ground-based navigational transmitters would remain the same under both the Proposed Action and No Action Alternative.

Presently, seven SIDs are published for MDW, including two non-RNAV SIDs (CICERO FIVE and MIDWAY EIGHT) and five RNAV SIDs. Three STARs, transition aircraft from the en route airway structure to the SIAPs. Two of these are non-RNAV STARs, which would remain unchanged under the Proposed Action. However, one RNAV STAR (FISSK) would be modified.

Aircraft approach the runway ends via any of the 13 SIAPs that currently exist, including one RNP-AR SIAP. Of these SIAPs, the RNAV (RNP) Runway 13C, along with the three ILS (Runways 4R, 13C, and 31C), would be modified, while the VOR/DME RNAV or GPS 22L SIAP would be decommissioned and replaced with an RNAV (GPS) 22L SIAP. The remaining SIAPs (including seven RNAV [GPS] approaches to Runways 4L, 4R, 13C, 13L, 22R, 31C, and 31R as well as a charted visual approach (I-55 Visual) to Runway 13C) would be retained unchanged.

3.3.2 Differences

In the west side of ZAU airspace, the proposed procedures (lateral path defined by the navigational guidance) would implement a RNAV STAR where none exists today. Under the Proposed Action, this would allow aircraft to plan for a more direct route, increasing flight path predictability and reducing pilot-controller voice communications. In contrast, the existing published procedures (i.e., No Action Alternative) are less direct and/or require more frequent pilot-controller radio communication to radar vector the aircraft along a more efficient flight path when conditions permit.

The proposed action would consist of creating RNAV STARs with RNP allow runway transitions from the STAR to the runway. For those aircraft not using RNP, the RNAV STAR would bring the aircraft to the downwind leg, thereby minimizing radar vectors and communication between ATC and pilots.

Currently there is one RNP approach procedure at MDW, serving Runways 13C. Under the Proposed Action, the existing RNP Approach would be modified and additional RNP Approaches serving the balance of the SW/NE and NW runways at MDW would be developed (Runways 4R/22L and 31C). These approaches may begin while the aircraft is on a downwind leg, parallel to the runway. Implementation of these procedures would improve lateral flight path accuracy (i.e., the extent to which the aircraft flight track matches the published procedure), increasing predictability. Additionally, a proposed RNP Approach to Runway 22L would represent a considerable improvement compared to either the existing VOR/DME RNAV or RNAV (GPS) Runway 22L or the existing ILS Runway 31C circle to land 22L non-precision approaches. The minimum descent altitude/decision altitude would be lower than either of those two existing options, allowing greater utility during periods of low cloud ceilings and SW winds. The Runway 31C circle to land 22L has a minimum descent altitude/decision altitude is 1,180 ft. above mean sea level (MSL) which is 560 ft. above ground level (AGL) which is lower than the 1,300 ft. MSL (680 ft. AGL) minimum descent altitude/decision altitude available from the VOR/DME RNAV or GPS 22L approach procedure. The proposed RNAV (RNP) 22L approach would allow aircraft to descend to 986 ft. MSL (380 ft. AGL).

The following sections provide tabular and graphical comparisons of the MDW air traffic procedures for the Proposed Action and No Action Alternative.

Table 2 Comparison of Procedures under the Proposed Action and No Action Alternative

Existing Procedure	New or Modified Procedure	Corner Post / Boundary	Comments
FISSK ONE RNAV STAR	FISSK TWO RNAV STAR	SE	Proposed Action is to modify current design. Both are identical inbound from en route transitions to HALIE RNAV waypoint. Modified FISSK TWO RNAV STAR would have three branches serving all four runway ends at MDW; each branch would be north of current procedure track from HALIE to CGT VOR. Current design has no runway-specific transitions, nor does current design tie into existing/proposed RNP Approaches to runway ends, whereas Proposed Action would do so.
GOSHEN FIVE STAR	PANGG ONE RNAV STAR	SE	Existing conventional navigation GOSHEN FIVE STAR would be retained for conventionally (i.e., non-RNAV) equipped aircraft arriving from SE corner-post. Proposed PANGG ONE RNAV STAR would be identical inbound from en route transition to HALIE intersection/RNAV waypoint. Proposed PANGG ONE RNAV STAR would have three branches serving all four runway ends at MDW; each branch would be north of current procedure track from HALIE to CGT VOR. Current design has no runway-specific transitions nor does current design tie into existing/proposed RNP Approaches to runway ends whereas proposed design would do so.
MOTIF FOUR STAR	ENDEE ONE RNAV STAR	SW	Existing conventional navigation MOTIF FOUR STAR would be retained for conventionally (i.e., non-RNAV) equipped aircraft arriving from SW corner-post. Proposed ENDEE ONE RNAV STAR would be somewhat similar to existing design inbound from en route transition to Joliet VOR (JOT); however, the route segments are not identical; in lieu of crossing JOT, the ENDEE ONE RNAV STAR would cross the STKNY waypoint. The ENDEE ONE RNAV STAR would have five transitions from the en route airway structure. The ENDEE ONE RNAV STAR would have four branches after the STKNY waypoint serving all four runway ends at MDW; each branch would be north of current procedure track from MOTIF to JOT. Current design has no runway-specific transitions nor does current design tie into existing/proposed RNP Approaches to runway ends whereas proposed design would do so.
CICERO FIVE and MIDWAY EIGHT SIDs (Radar Vector)	CICERO FIVE and MIDWAY EIGHT SIDs (Radar Vector)	E, S, W	Existing conventional navigation, radar vector SIDs would be retained, unchanged for conventionally (i.e., non-RNAV) equipped aircraft departing to the west and for all departures to south and east.
Current, Initial Departure Headings Assigned to Aircraft Using Runways 22L, 22R, 31L, 31C, and 31R when Arrivals are Landing 22L	Modified, Initial Departure Headings Assigned to Aircraft Using Runways 22L, 22R, 31L, 31C, and 31R when Arrivals are Landing 22L	E, S, W	Initial Headings after departure would be modified for eastbound aircraft departing off Runways 22L, 22R, 31L, 31C, and 31R from a clockwise turn to 090° to a counterclockwise turn to 200° to de-conflict with proposed RNAV (RNP) and RNAV (GPS) approaches to Runway 22L.
RNAV (RNP) Y Runway 13C Approach	RNAV (RNP) Runway 4R, 22L, and 31C Approach	N/A	The existing RNP approach to Runway 13C would be retained and augmented with RNP approaches to the other three runway ends (4R, 13C, 22L) would be published. During periods when air traffic congestion, weather, or other operational issues would not allow use of RNAV (RNP) procedures, ATC would assign non-RNP approaches (e.g., existing ILS procedures).
VOR/DME RNAV or GPS 22L Approach	RNAV (GPS) 22L Approach	N/A	Existing VOR/DME RNAV or GPS 22L Approach would be decommissioned. A new RNAV (GPS) 22L approach would be published.
ILS 4L, 13C, 31C Approaches	RNAV Transitions to ILS final approach courses	E, SE, SW	Existing ILS SIAPs would be modified to add transitions that would join with the end-points of the proposed RNAV STARs (FISSK, ENDEE, and PANNG). Existing non-RNAV transitions would remain.
RNAV (GPS) 4L, 4R, 13L, 13C, 22R, 31C, and 31R Approaches	No change		Existing non-precision RNAV SIAPs would be retained for non-RNP equipped aircraft landing at MDW.

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Chicago Midway

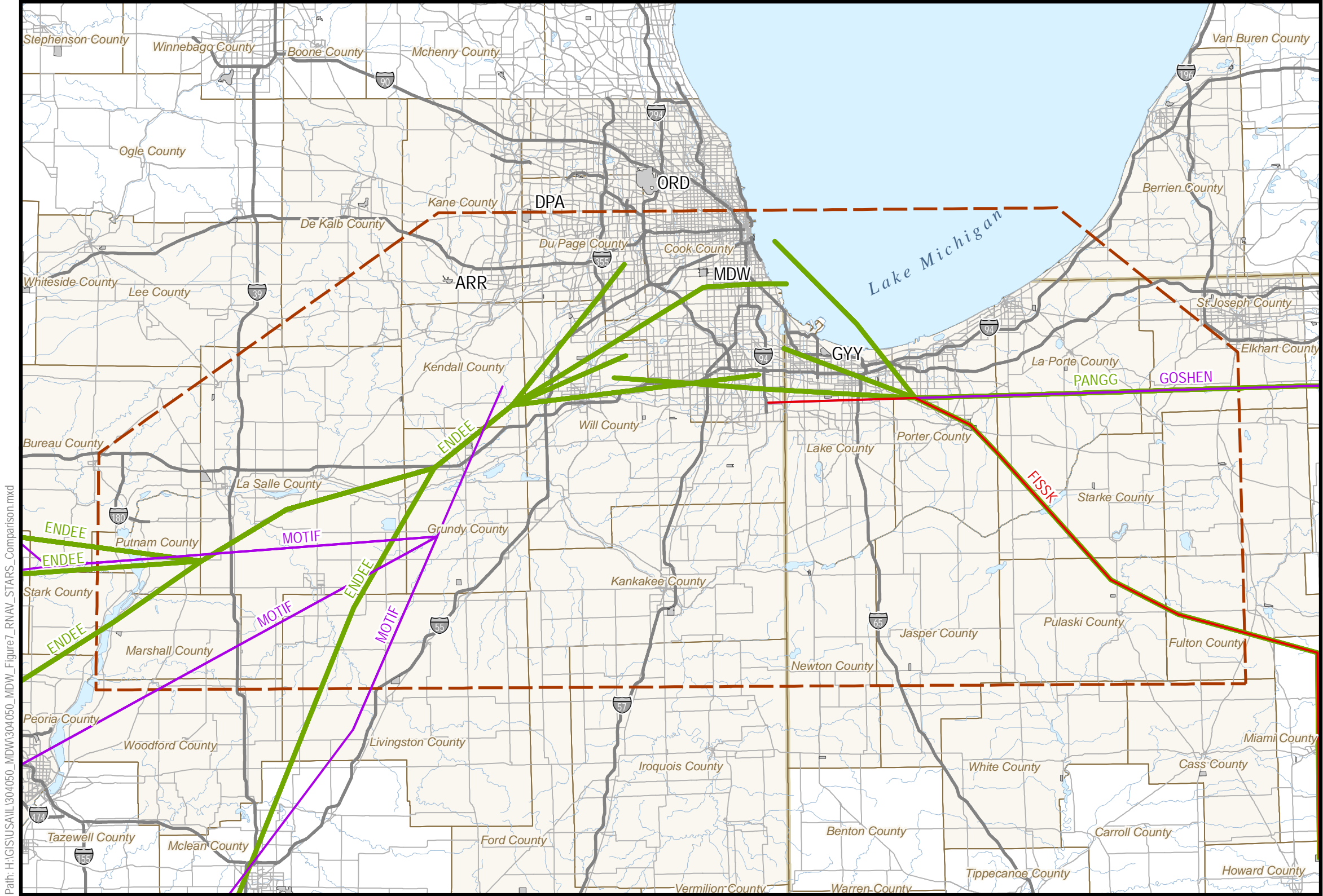
Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports
- Existing Non-RNAV STAR Procedure
- Existing RNAV STAR Procedure
- Proposed RNAV STAR Procedure
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

Figure 7
Comparison of RNAV STARs under Proposed Action and No Action Alternative



Path: H:\GIS\US\AIL\304050_MDW_Figure7_RNAV_STARS_Comparison.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Railroad), February 10, 2013; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary

Airports

Runways

Existing RNP Procedure

Proposed RNP Procedure

Proposed GPS Procedure

Proposed RNAV STAR Procedure
- Major Cities

Detailed Cities

Highways

Secondary Highways

Counties within Study Area Boundary

State Boundary

County Boundary

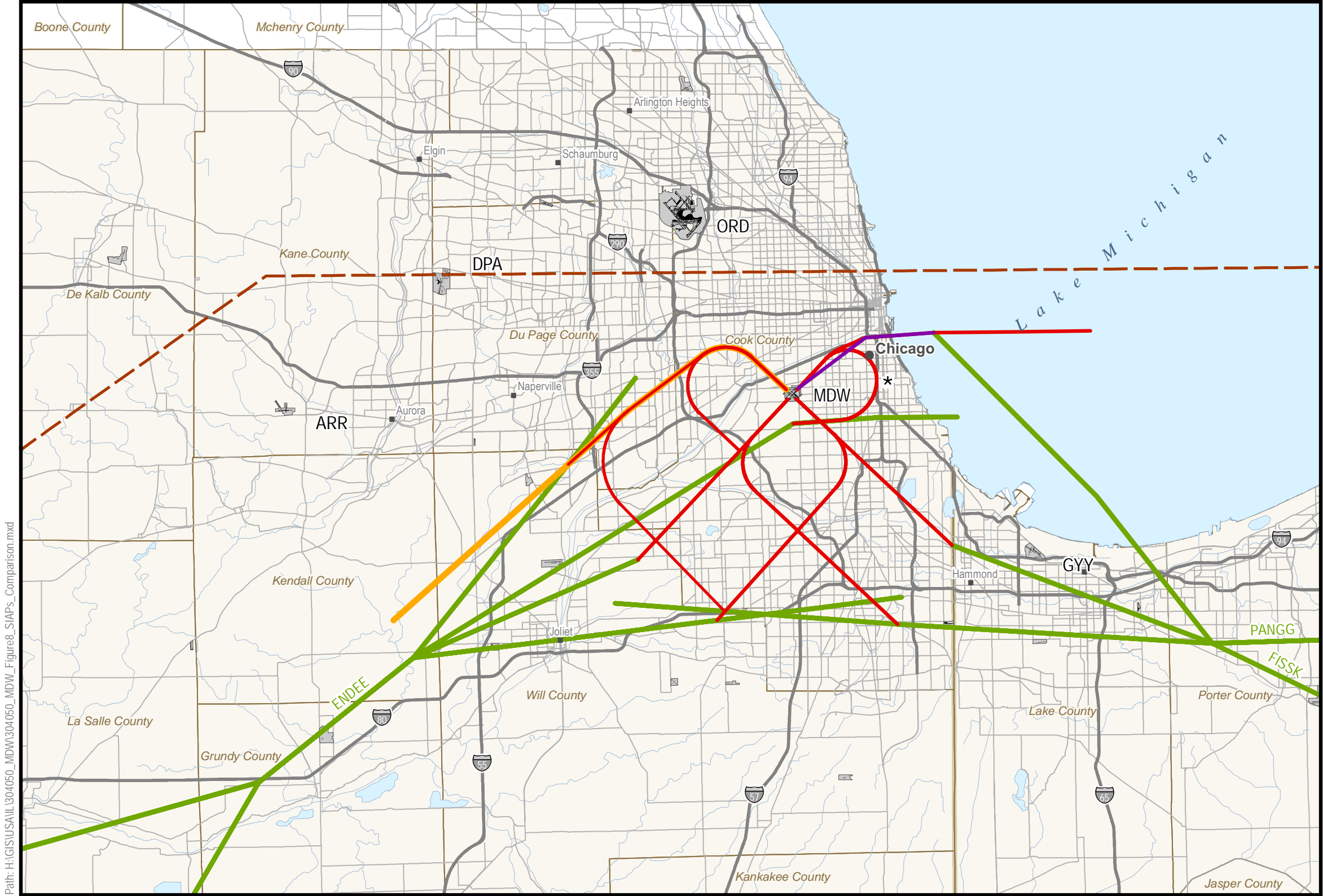
Water Body

Stream / Shore Line

Notes:
★ This segment of the RNAV (RNP) 22L SIAP would only be used when no conflicting traffic from southeast is present.

MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GY - Gary/Chicago International Airport

Figure 8
Comparison of SIAPs under Proposed Action and No Action Alternative



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Airports
- Runways
- Runway 22L Proposed Action Arrival (Backbone Tracks)
- Runway 22L Proposed Action Arrival (Dispersed Tracks)
- Runways 4L/R, 13L/C/R, 31L/C/R Proposed Action Departure (Backbone Tracks)
- Runways 4L/R, 13L/C/R, 31L/C/R Proposed Action Departure (Dispersed Tracks)
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Railroad
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

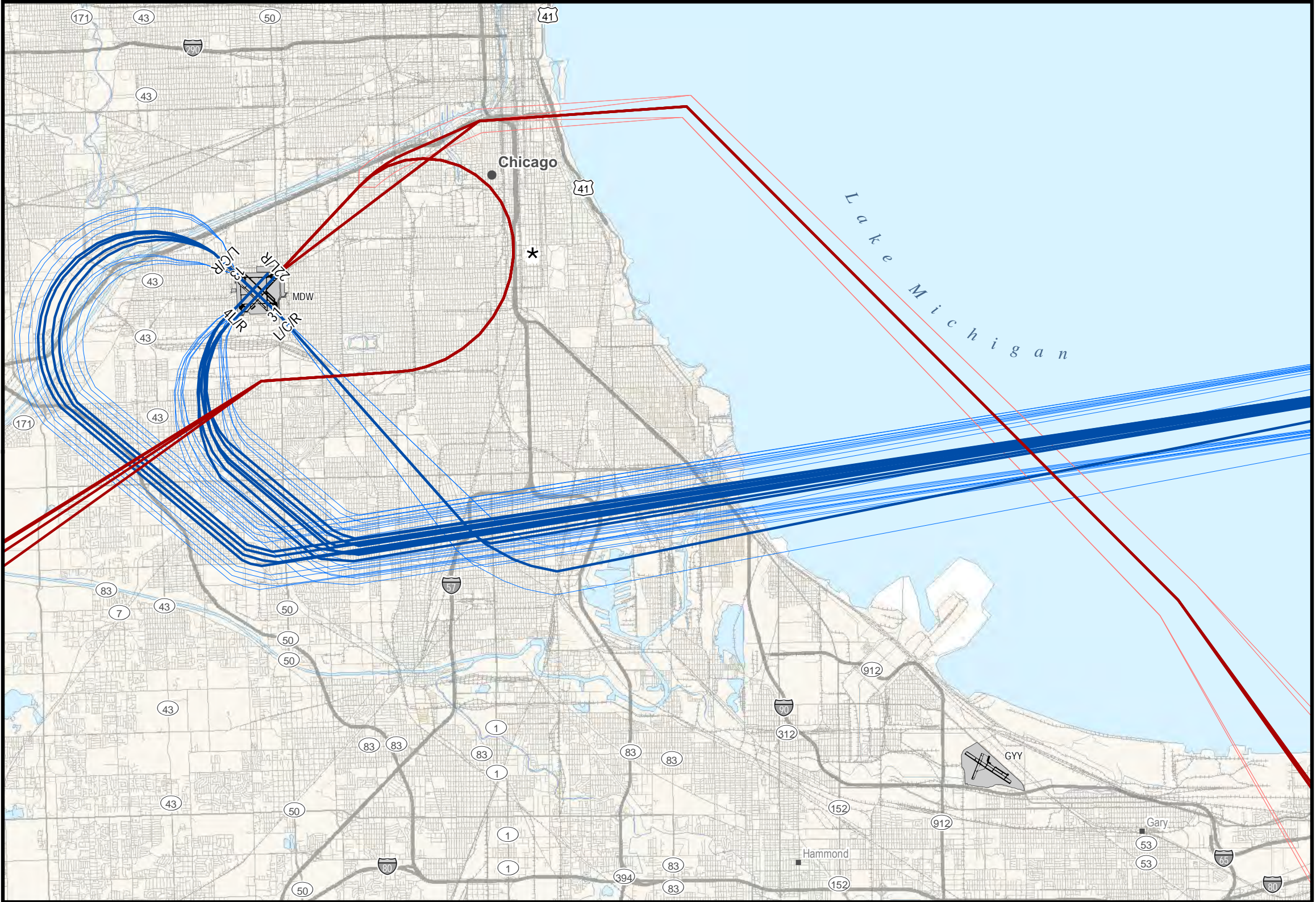
Notes:
★ This segment of the RNAV (RNP) 22L SIAP would only be used when no conflicting traffic from southeast is present.

MDW - Chicago Midway International Airport
GYG - Gary/Chicago International Airport

Figure 9

Departure Heading Changes under
Proposed Action Alternative

Path: H:\GIS\USAINL\304050_MDW\Figure9_SIDs_Comparison.mxd



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Railroad), February 10, 2013; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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3.4 ALTERNATIVES NOT CARRIED FORWARD FOR DETAILED ANALYSIS

As part of the iterative process described above, the FAA refined the design of the proposed new or revised air traffic procedures serving MDW to reflect operational or environmental considerations. In particular, the proposed RNP-AR SIAP to Runway 22L as well as the Proposed RNAV (GPS) SIAP to 22L were revised to minimize predicted noise exposure (RNP-AR SIAP) and to avoid constraints imposed by the presence of the Willis Tower (RNAV [GPS] SIAP).

3.5 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Table 3 below presents a comparison of each Proposed Action air traffic procedure to the Purpose and Need. Of the two alternatives carried forward for detailed analysis, the Midway Proposed RNAV/RNP Procedures (i.e., Proposed Action) would most effectively meet the Purpose and Need, and, therefore, is the Preferred Alternative. The No Action Alternative does not directly address the Purpose and Need and, therefore, existing sub-optimal air traffic procedures would remain. Although it would not meet the Purpose and Need, the No Action Alternative is carried forward, as required by CEQ regulations, to establish a benchmark against which a decision-maker and the public can compare the magnitude of the environmental effects of undertaking the Proposed Action.

Table 3 Comparison of Procedure Changes to Purpose & Need Criteria

No.	Corner-post / Airspace Boundary Side	Procedure Name	Procedure Type	Improves Efficiency to Accommodate Air Traffic	Leverages NextGen Avionics Technology	Overcomes Constraints of Ground-Based Navigation	Intent of Procedural Change
1	East	CICERO FIVE and MIDWAY EIGHT	SID / Radar Vector (non-RNAV)	Y	Y	Y	Retained for non-RNAV equipped aircraft; initial Heading change for eastbound aircraft departing off Runways 22L, 22R, 31L, 31C, and 31R from clockwise turn to 090° to a counterclockwise turn to 200° to de-conflict with aircraft landing on Runway 22L.
2	SE	FISSK ONE RNAV STAR	STAR	Y	Y	Y	Allows flow-specific runway transitions for aircraft arriving from east; ties into proposed RNP Approaches
3	SE	PANGG RNAV	STAR	Y	Y	Y	Allows flow-specific runway transitions for aircraft arriving from south-southeast; ties into proposed RNP Approaches
4	South	CICERO FIVE and MIDWAY EIGHT	SID / Radar Vector (non-RNAV)	Y	Y	Y	Retained for non-RNAV equipped aircraft. Initial Heading change for southbound aircraft departing off Runways 22L, 22R, 31L, 31C, and 31R from clockwise turn to 090° to a counterclockwise turn to 200° to de-conflict with aircraft landing on

No.	Corner-post / Airspace Boundary Side	Procedure Name	Procedure Type	Improves Efficiency to Accommodate Air Traffic	Leverages NextGen Avionics Technology	Overcomes Constraints of Ground-Based Navigation	Intent of Procedural Change
							Runway 22L.
5	SW	ENDEE RNAV	STAR	Y	Y	Y	Allows flow-specific runway transitions for aircraft arriving from west; ties into proposed RNP Approaches
6	N/A	RNAV (GPS) 22L Approach	RNAV (GPS) SIAP	Y	Y	Y	Existing VOR/DME RNAV or GPS 22L Approach would be decommissioned. A new RNAV (GPS) 22L approach would be published.
7	N/A	RNP Approaches to Runways 4R, 22L, 31C	RNP SIAP	Y	Y	Y	Provides greater all-weather airport capability; increases operational efficiency by creating air traffic procedure that replicates what currently occurs during visual conditions.
8	All	RNAV Transitions to ILS Approaches to Runways 4L, 13C, 31C	ILS SIAP	Y	Y	Y	Allows “direct-to” RNAV course guidance from RNAV STAR to ILS final approach course. Ties into proposed RNAV STARs.

3.6 ADDITIONAL ENVIRONMENTAL STATUTES AND REGULATIONS

The actions described in this document have been evaluated and comply with applicable statutes and regulations. The following is a list of FAA Orders, Executive Orders (EO), Federal Regulations, and legislation that are applicable to the Proposed Action:

- *Clean Air Act*, U.S. Code, Title 42, Chapter 85
- *Code of Federal Regulations*, “CEQ NEPA regulations,” Title 40, Parts 1500-1508
- EO 11988 and 11990, *Floodplain Management and Protection of Wetlands*
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
- EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*
- EO 12372, *Intergovernmental Review of Federal Programs*
- DOT 5110, *Procedures for Considering Environmental Impacts*

- FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*
- FAA Order JO 7400.2J, *Procedures for Handling Airspace Matters*
- *National Environmental Policy Act*, U.S. Code, Title 42, sec. 4321- 4347

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4 AFFECTED ENVIRONMENT

This chapter of the EA describes the existing environmental conditions within the geographic area that could potentially be affected by the Proposed Action. The description of the Affected Environment provides the context to assess the environmental impacts of the Proposed Action, which are presented in Chapter 5, *Environmental Consequences*. Section 4.1 lists the environmental impact categories that the Proposed Action would not have potential to affect. Since neither the Proposed Action nor the No Action Alternative would involve construction or land-disturbing activities, the potential environmental consequences are limited, and several impact categories would have no potential effects. Section 4.2 then provides a description of the study area and Section 4.3 presents, in detail, the environmental impact categories for which the Proposed Action would have potential effects. Finally, Section 4.4 presents a description of past, present, or reasonably foreseeable future actions which, while not part of the Proposed Action, are identified for consideration of the potential cumulative effects that may occur in conjunction with implementation of the Proposed Action. Chapter 5 includes the actual cumulative effects analysis.

4.1 ENVIRONMENTAL IMPACT CATEGORIES UNAFFECTED BY THE PROPOSED ACTION

The FAA considered the following environmental impact categories for potential environmental impacts but determined that further detailed analysis would not be required. There would be no potential for the Proposed Action to affect the following resource categories, for the reasons noted below:

- Coastal Resources – Without construction or land-disturbing activities, there is no potential for the Proposed Action to affect coastal resources or barrier islands.
- Construction Impacts – The Proposed Action does not involve any construction activities.
- Farmlands – The Proposed Action would not have potential to convert existing prime farmland to a non-agricultural use and would not affect the agricultural economy of the area.
- Floodplains – Without construction or land-disturbing activities, there is no potential for the Proposed Action to affect floodplains.
- Hazardous Materials, Pollution Prevention, and Solid Waste – The Proposed Action would not generate, disturb, transport, or treat hazardous materials.
- Light Emissions and Visual Impacts – The Proposed Action would not involve construction of any ground infrastructure or facilities that would create light emissions or create a change to the landscape architecture or viewshed. The visual sight of aircraft, aircraft contrails, or aircraft lights at night is not normally considered to have potential for a significant impact.
- Natural Resources and Energy Supply – The Proposed Action would not require unusual natural resources or materials, or those in short supply.
- Socioeconomic impacts and children's environmental health and safety risks:

- Socioeconomic impacts – The Proposed Action would not involve acquisition of real estate, relocation of residents or community businesses, disruption of local traffic patterns, loss in community tax base, or changes to the fabric of the community.
- Children’s Environmental Health - The Proposed Action would not affect products or substances that a child is likely to come into contact with, ingest, use, or be exposed to, and would not result in environmental health and safety risks that could disproportionately affect children.
- Secondary (Induced) Impacts – The Proposed Action would not have the potential for induced or secondary impacts on surrounding communities. It would not cause changes in patterns of population movement or growth, public service demands, or business and economic activity. Furthermore, the Proposed Action does not involve construction activities, so it would not involve the relocation of people or businesses.
- Water Quality – Without construction or land-disturbing activities, there is no potential for the Proposed Action to increase impervious surfaces or affect water quality or ground water.
- Wetlands – Absent construction or land-disturbing activities, there is no potential for the Proposed Action to affect wetlands.
- Wild and Scenic Rivers – The Proposed Action would not foreclose or downgrade Wild, Scenic, or Recreational river status of a river or river segment included in the Wild and Scenic River System.

In order to focus analysis on impact categories with potential for significant environmental impact, or on uncertainties that may require evaluation, the EA does not provide any detailed description of the affected environment associated with these impact categories listed in this section. Accordingly, there is no detailed discussion of these resources in Chapter 5.

4.2 ENVIRONMENTAL ASSESSMENT STUDY AREA

A *study area* is the geographic area within which environmental impacts could potentially occur as a result of implementation of the Proposed Action. FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures*, and Joint Order (JO) 7400.2J, *Procedures for Handling Airspace Matters*, provide guidelines for establishing study areas for changes to air traffic procedures spanning areas beyond the immediate vicinity of an airport, such as new or modified air traffic procedures. According to FAA Order 1050.1E, paragraph 14.5e, for air traffic airspace actions where the study area is larger than the immediate vicinity of an airport, incorporates more than one airport, or includes actions above 3,000 ft. AGL, noise modeling will be conducted using the Noise Integrated Routing System (NIRS).⁴¹ For those types of studies, NIRS will be used to determine noise impacts from the ground to 10,000 ft. AGL. For the purposes of this EA, the study area is larger than the immediate vicinity of the airport; therefore, FAA is using 10,000 ft. AGL as the cutoff.⁴² Additionally, FAA Order JO 7400.2J recommends

⁴¹ FAA Order 1050.1E, Chg. 1, “Environmental Impacts: Policies and Procedures,” App. A, sec. 14.5e, March 20, 2006.

⁴² FAA Memorandum, “Altitude Cut-Off for National Airspace Redesign (NAR) Environmental Analysis,” September 15, 2003. See JO 7400.2J Chapter 32, Paragraph 32-2-1b.

considering proposed changes between 10,000 and 18,000 ft. AGL when the proposed changes are over a National Park or Wildlife Refuge.⁴³

In consideration of these requirements and using methodology described further in Section 4.2.3, the FAA developed a geographic study area for this EA. The MDW study area consists of an irregular, six-sided polygon, with an area of 10,402.2 square nautical miles (NM²). At its greatest east-west extent, it has a width of approximately 145 nautical miles (NM) and its greatest north-south extent is approximately 60 NM. Midway airport lies in the northern portion of the study area, approximately equidistant between the western and eastern lateral extents. Figure 10 depicts the MDW EA study area. Appendix E.3, Noise Modeling Technical Report (NIRS), presents further information on the methodology for developing the study area.

The geographic area for each impact category can vary, sometimes coinciding with the entire study area but more often constituting a smaller area within the study area. The relevant geographic area can, and often does, differ from one impact category to another (e.g., Compatible Land Use area can be different from Air Quality area). Effects on some environmental impact categories may be highly localized and confined, whereas others may cover a broader geographic area. Given the vast size and geographical diversity of the study area, focusing on specific geographic areas for each environmental impact category enables a more complete analysis of the potential effects of the Proposed Action.

⁴³ FAA Order JO 7400.2J, Chg. 1, “Procedures for Handling Airspace Matters,” sec. 32-2-1b, July 26, 2012.

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

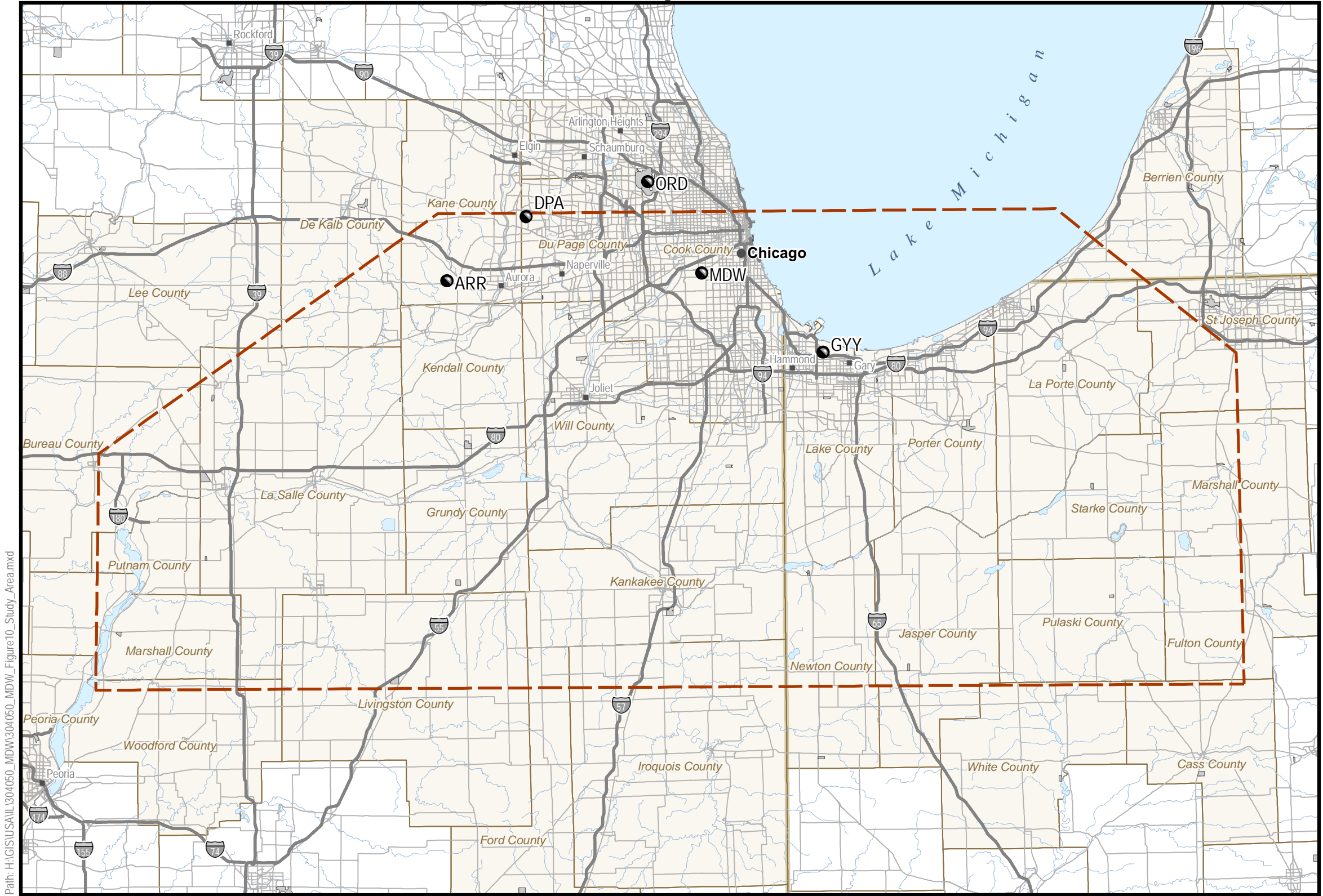
- Study Area Boundary
- Airports
- Study Airport
- Major Cities
- Highways
- Counties within Study Area Boundary
- State Boundary
- Water Body
- Detailed Cities
- Secondary Highways
- County Boundary
- Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport



Figure 10

Study Area



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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4.3 POTENTIALLY AFFECTED ENVIRONMENTAL IMPACT CATEGORIES

This section provides information on the existing conditions within the study area for those environmental resource or impact categories that the Proposed Action could affect. These environmental impact categories are as follows, listed in order of the degree of potential impact, or where one category (e.g., Noise) sets the stage for understanding effects on another (e.g., Compatible Land Use):

- Noise
- Compatible Land Use
- Department of Transportation Act, Section 4(f) Resources
- Historical, Architectural, Archeological, and Cultural Resources
- Air Quality
- Natural Resources and Energy Supply (Aircraft Fuel)
- Climate
- Fish, Wildlife, and Plants
- Environmental Justice

4.3.1 Noise

Aircraft noise is often the most noticeable environmental effect associated with aviation projects and often affects other analyzed impact categories (e.g., compatible land use, potential Section 4(f) resources, and historic resources).⁴⁴ FAA Order 1050.1E provides specific policy and procedures for the assessment of aircraft noise for compliance with NEPA, as well as other laws and statutes. This section includes a brief synopsis of the aircraft noise modeling methodology used for this EA and provides a discussion of the existing aircraft noise exposure level within the study area. See Appendix E, *Aircraft Noise Analysis* for background information on the physics of sound, the effects of noise on people, noise metrics, and detail about the noise modeling process for this EA.

4.3.1.1 Definition of Impact Category

Day-Night Average Sound Level (DNL) Metric

The FAA has determined that the exposure of individuals to noise resulting from aviation activities must be analyzed in terms of the yearly Day-Night Average Sound Level (DNL), which is a single value of sound exposure for a complete 24-hour period, including all of the time-varying sound energy within the period, computed for the Average Annual Day (AAD) of aircraft operations for specified years of interest. To emphasize the greater annoyance factor of noise events that occur at nighttime, when people typically sleep and ambient noise levels are lower, DNL includes an additional 10-decibel (dB) weighting for noise events occurring between 10:00 P.M. and 7:00 A.M. The 10 dB weighting essentially equates one nighttime aircraft operation to

⁴⁴ FAA Order 1050.1E, Chg. 1, App. A, sec. 14.

ten daytime operations. Appendix E.1, *Basics of Noise*, provides further information on the DNL metric.

Noise Modeling Methodology

In addition to requiring the use of the DNL metric, the FAA also requires that aircraft noise be evaluated using authorized computer noise models. For this EA, the FAA has relied upon two noise models to characterize the noise setting. The model used depends upon whether or not the portion of the study area is in the immediate vicinity of MDW. For areas in the immediate vicinity of the airport, FAA relies upon the Integrated Noise Model (INM). For portions of the study area not in the immediate vicinity of the airport – in general, where the action would include aircraft at or above 3,000 ft. AGL – the FAA relies upon the Noise Integrated Routing System (NIRS).⁴⁵ Results and analysis in this document are presented separately, in accordance with this division, reflecting the differing models used. This separate presentation also is applied to the Compatible Land Use (4.3.2), DOT Act, Section 4(f) (4.3.3), and Historical, Architectural, Archaeological, and Cultural Resources (4.3.4) sections.

MDW Environs

Total number of annual operations at MDW for calendar year (CY) 2011 was 257,800. The FAA's January 2012 Terminal Area Forecast (TAF) projected 260,157 annual operations for the calendar year 2012, which is a difference of less than one percent from the actual CY 2011 data. No notable changes in aircraft fleet mix occurred between 2011 and 2012. Therefore, the CY 2011 data is reflective of existing conditions (2012), as presented in Table 4^{46,47}

Table 4 Midway Airport Annual Operations under Existing Conditions (2012)

Passenger	GA	Military	Total
197,672	57,828	2,300	257,800

Source: CDA, "2013 Part 150 Study Update," Appendix D, Table D-1.

The existing conditions (2012) data used for this EA is representative of an average-annual day of operations, derived from the City of Chicago's Airport Noise Management System (ANMS), airline schedules, airport landing fee reports, discussions with operators, and the FAA's Air Traffic Activity Data System (ATADS). This data included the number of arrival and departure operations by individual types of aircraft during daytime and nighttime periods, the distribution of aircraft activities among the runway ends, and the distribution of aircraft along the flight paths leading to or from each runway. These operating levels represent the average number of operations that occurred during CY 2011. See Appendix E.2, *Integrated Noise Model (INM) Technical Report*, for detail regarding use of CY 2011 operations data and application of INM to derive noise levels from this data.

⁴⁵ FAA Order 1050.1E, Chg. 1, App. A, sec. 14.5e.

⁴⁶ CDA, "2013 Part 150 Study Update," Section 1.1.5. Appendix D from that document, reproduced as Appendix E.2 in this EA, provides detailed information on assumptions, modeling inputs, and results for the MDW Part 150.

⁴⁷ The baseline data reflected in the CDA 2013 Part 150 Study Update (NEM-1 2012 Existing Conditions) relied upon a data collection that began in 2011 prior to the availability of 2012 data. This EA also was begun prior to the availability of 2012 data.

Study Area beyond MDW Environs

For analysis of those parts of the study area beyond the immediate environs of MDW, this EA involved a detailed analysis of IFR aircraft for existing conditions (2012) using NIRS. Although the noise environment around MDW comes almost entirely from jet aircraft operations, the DNL calculations reflect noise from many types of jet and propeller aircraft operations on IFR flight plans, which the Proposed Action could affect. Most aircraft around MDW operate IFR to obtain ATC separation services in these busy areas.

The CY 2011 operations data developed by CDA using INM became the foundation of modeling inputs for NIRS. Certain alterations and exceptions were necessary due to differences in permissible input data that exist between INM and NIRS. Appendix E.3, *Noise Integrated Routing System (NIRS) Technical Report*, describes the process employed to take the INM modeling data and operating assumptions and modify it to model noise exposure at points outside of the immediate environs of MDW.

NIRS requires a variety of inputs, including local environmental data (e.g., terrain, temperature, and humidity), runway layout, fleet mix (i.e., aircraft type), aircraft operations, runway use, and flight tracks (including flight origin and destination). Detailed information on aircraft operations within the study area was assembled for input into NIRS, including fleet mix data that helps to define the number and type of aircraft operations at MDW, and runway use and flight track data that provide information on where and how frequently aircraft travel in the study area. As described in Section 4.2, the FAA developed modeled flight tracks from radar data used for determining the study area. Then, this data was compared with aircraft overflight monitoring data routinely collected by the CDA, which indicated that the data were representative of flight operations at MDW.

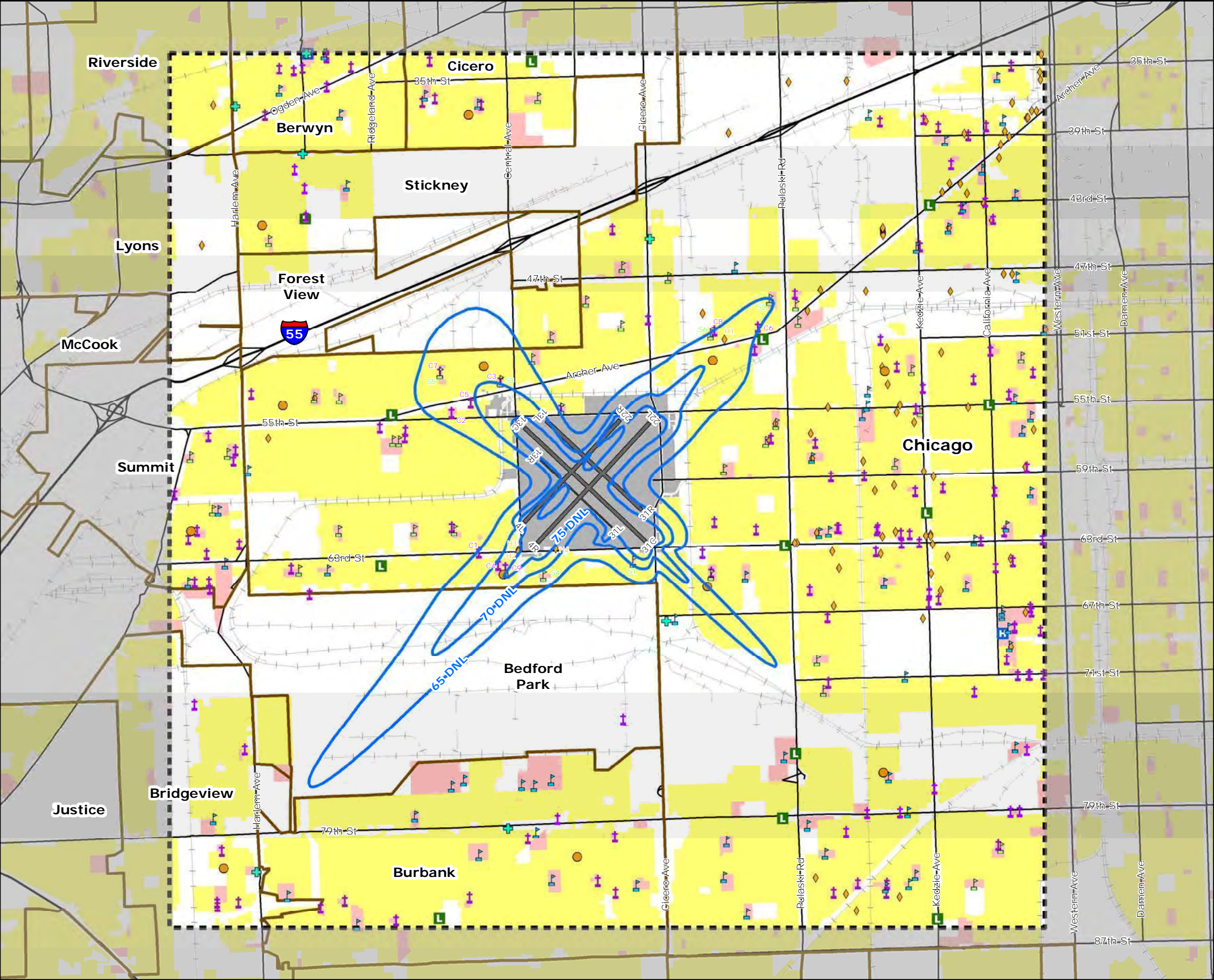
4.3.1.2 Existing Conditions


This section presents the baseline noise setting that result from current operations at MDW.

MDW Environs

The Noise Exposure Map (NEM) in Figure 11 depicts the AAD noise exposure pattern present at MDW for existing conditions (2012), reflective of typical operating conditions. The NEM was based on aircraft operations occurring during calendar year 2011. Since the FAA's 2012 TAF has a difference of less than one percent from the actual CY 2011, operations and noise level data for 2012 are approximately those of 2011, so the information developed for the year 2011 is also representative of the noise levels present during existing conditions (2012). Thus, the CDA believes that this data is representative of conditions present in 2012.

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**Midway
International
Airport**

City of Chicago
Rahm Emanuel
Mayor


Department of Aviation
Rosemarie S. Andolino
Commissioner

**FINAL
14 CFR Part 150 Study
Existing Conditions (2012)
Noise Exposure Map**

Legend


- Noise Contours
- Study Area
- Municipal Boundaries
- Compatible Land Use
- Residential
- Institutional, Medical, Education, Religious
- Existing Airport Property
- Interstates
- Major Roads
- Railroads
- Schools
- Schools - Sound Insulated
- Churches
- Historical Sites
- Nursing Homes
- Libraries
- Hospitals
- Permanent Noise Monitors

Feet
0 2,000 4,000

**N**

**Exhibit:
NEM-1**

Date: February 5, 2013
File: Existing_Conditions.mxd



Source: ESRI Data & Maps, 2012; Land Use: Northeastern Illinois Planning Commission, 2005.

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Table 5 summarizes the area within each noise contour level. The noise exposure contours do not represent the noise levels present on any specific day. Rather, they represent the daily energy average of all 365 days of operation during the year. The noise contour pattern extends from the Airport along each extended runway centerline, reflective of the flight tracks used by all aircraft. The relative distance of the contours from the airport along each route is a function of the frequency of the use of each runway for total arrivals and departures, as well as its use at night, and the number and type of aircraft assigned to it. The shape of the noise contours is primarily a function of the combination of flight tracks, time of operations, and runway use at MDW. The shape of the noise contours to the northwest of the Airport reflects the predominant use of Runway 31C for departures. The elongated shape of the contours to the southwest of the Airport reflects the predominant use of Runways 4L and 4R for arrivals. The minimal usage of Runway 13C for departures is apparent from minimal size of the noise exposure contour emanating to the southeast.

Table 5 Area within Noise Contour Bands for Midway Airport Existing Conditions (2012) Noise Exposure Map

Contour Range	Contour Area
65-70 DNL	2.3 mi ²
70-75 DNL	0.7 mi ²
75+ DNL	0.6 mi ²
TOTAL – 65+ DNL	3.6 mi ²
Note: Figures are rounded to the nearest tenth of a square mile. The total area of the 65+ DNL noise exposure contour may not equal sum of individual contour bands due to rounding. Source: CDA, "2013 Part 150 Study Update"	

Table 6 summarizes the estimated population, housing units, and number of noise-sensitive public facilities within the 65 DNL noise exposure contour for existing conditions (2012) conditions. There are 7,208 housing units and an estimated population of 21,544 people located within the 65 DNL of the Existing Conditions (2012) contour. All of these housing units are located within the City of Chicago and Unincorporated Cook County. Of those housing units, 4,874 have received, or are in the process of receiving sound insulation. The owners of 1,002 of the remaining housing units either did not respond to the CDA offer or refused previous offers for mitigation.⁴⁸ Six (6) schools and nine (9) churches are located within the Existing Conditions (2012) DNL 65 dB contour. Churches were not included in the mitigation program measures in a 1992 Part 150 study. See Section 4.3.2 for more information.

⁴⁸ The CDA sent letters to the owners of all properties that were eligible for participation in the Residential Sound Insulation Program (RSIP) under the 1995, 2000 and 2004 contours. An additional letter requesting their intent to participate in the program was sent to residences that did not respond to the initial invitation. These housing units would be invited to participate in future RSIP.

**Table 6 Housing Units, Population, and Noise-Sensitive Public Facilities within Midway Airport Existing Conditions (2012)
Noise Exposure Contour**

	75+ DNL	70-75 DNL	65-70 DNL	65+ DNL
Housing Units				
Sound Insulated – Completed	68	688	4,097	4,853
Sound Insulated – In Progress	0	5	16	21
Previously Dropped/Declined Participation	11	89	902	1,002
Remaining Housing Units Potentially Eligible to Receive Sound Insulation	24	274	1,034	1,332
Total Housing Units	103	1,056	6,049	7,208
Estimated Population	355	3,366	17,823	21,544
Noise-Sensitive Public Facilities				
Schools (All sound insulated)	0	1	5	6
Churches	0	2	7	9
Libraries	0	0	0	0
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Notes:				
1. The numbers of housing units were found by utilizing CDA's RSIP GIS database and were verified through aerial photography and field verification. Population numbers were estimated by utilizing the U.S. 2010 Census GIS layers, rounded to the nearest whole number.				
2. Housing Units denoted as "Sound Insulated – Completed" are those completed under RSIP Program years prior to 2011 and those denoted as "Sound Insulated – In Progress" are homes in the RSIP 2011 Program Year.				
3. Housing Units denoted as "Previously Dropped/Declined Participation" are those that were previously eligible for participation under past RSIP Program Years and either did not respond to invitations or declined to participate. These housing units would be invited to participate in future RSIP.				
Source: HMMH and URS Analysis of RSIP GIS database (as of Feb. 7, 2013), prepared by Landrum & Brown. See also CDA, "2013 Part 150 Study Update."				

Study Area beyond MDW Environs

For this aspect of the analysis, noise exposure from aircraft operations was calculated at more than 141,649 locations throughout the study area, consisting of the following:⁴⁹

1. Population centroids in the study area (i.e., centers of *census blocks*, described below)
2. Potential noise sensitive locations, such as parks and historic sites (see Sections 4.2.3 and 4.2.4, respectively)
3. Evenly spaced grids over the study area to record aircraft noise levels at potential noise sensitive locations that were not otherwise identified.

Census blocks are the smallest geographic unit for which the U.S. Census Bureau tabulates data. Streets, legal boundaries, and other features generally bound census blocks. For this noise analysis, the FAA estimated the exposure to various noise levels of all census block centroids⁵⁰ in the study area, categorized in ranges of DNL (e.g., less than 45 dB, 45-50 dB, etc.). The FAA then estimated the population exposed to those noise levels as the number of people residing in each census block. As noise levels may vary throughout a census block, the actual number of people affected at a given noise level may be more or less than the total population of that census block. For the MDW EA, the FAA analyzed 108,881 census blocks in the study area.

⁴⁹ This number of points modeled in NIRS is for the entire study area, including portions lying within the immediate vicinity of MDW. However, those points within the immediate vicinity are not relied upon for analysis since similar point data and contours from the INM and Part 150 study cover the immediate vicinity.

⁵⁰ The centroid is a single point that is the geographical center of the census block.

To describe the Affected Environment, the FAA established existing conditions (2012) noise exposure data to provide the public an opportunity to relate current personal experience with the degree of noise exposure reported. Moreover, the existing conditions (2012) noise analysis provides the foundation upon which noise modeling for future conditions (2013 and 2018) are developed, as presented in Chapter 5. The purpose of the baseline data is to provide a context for the degree of noise exposure reported. The information provided refers to noise exposure levels only within the study area. Table 7 provides the population exposed to AAD DNL from less than DNL 45 dB to over DNL 65 dB, grouped in increments specified under FAA Order 1050.1E, in accordance with recommendations under the 1992 Federal Agency Committee on Noise (FICON).⁵¹

Table 7 Population Exposed to Aircraft Noise under Existing Conditions (2012)

DNL Range (dB)	Population	Percent of Population	Color on Figure 12
Less than 45	3,240,744	53.86%	Gray
45 to less than 60	2,697,514	44.84%	Dark Blue
60 to less than 65	56,671	0.94%	Yellow
At or above 65	21,544	0.36%	Orange
Total	6,016,473	100%	
Notes:			
1. Noise results for less than DNL 65 dB are from modeling conducted by HMMH using NIRS. Noise results for at or above DNL 65 dB are from the CDA, "2013 Part 150 Study Update."			
Source: Harris Miller Miller & Hanson; CDA, "2013 Part 150 Study Update"			

Figure 12 provides a graphical representation of existing exposure levels to aircraft noise for all population centroid locations within the entire study area for existing conditions (2012). For each population centroid, the DNL ranges defined in Table 6 correspond with a color in Figure 12.

Areas closer to MDW are exposed to higher aircraft noise exposure levels than areas farther from airports. Additionally, as Figure 12 illustrates, areas with higher noise levels generally align with primary runways and flight patterns at MDW. The majority of the study area population (53.86 percent) is exposed to aircraft DNL of less than 45 dB, and the smallest population group (0.36 percent) is exposed to aircraft DNL of 65 dB and greater.

⁵¹ FAA Order 1050.1E, Chg. 1, App. A, sec. 14.4c.

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports
- Runways

2012 Existing DNL Levels at MDW, ORD, ARR, DPA and GYY within the Study Area

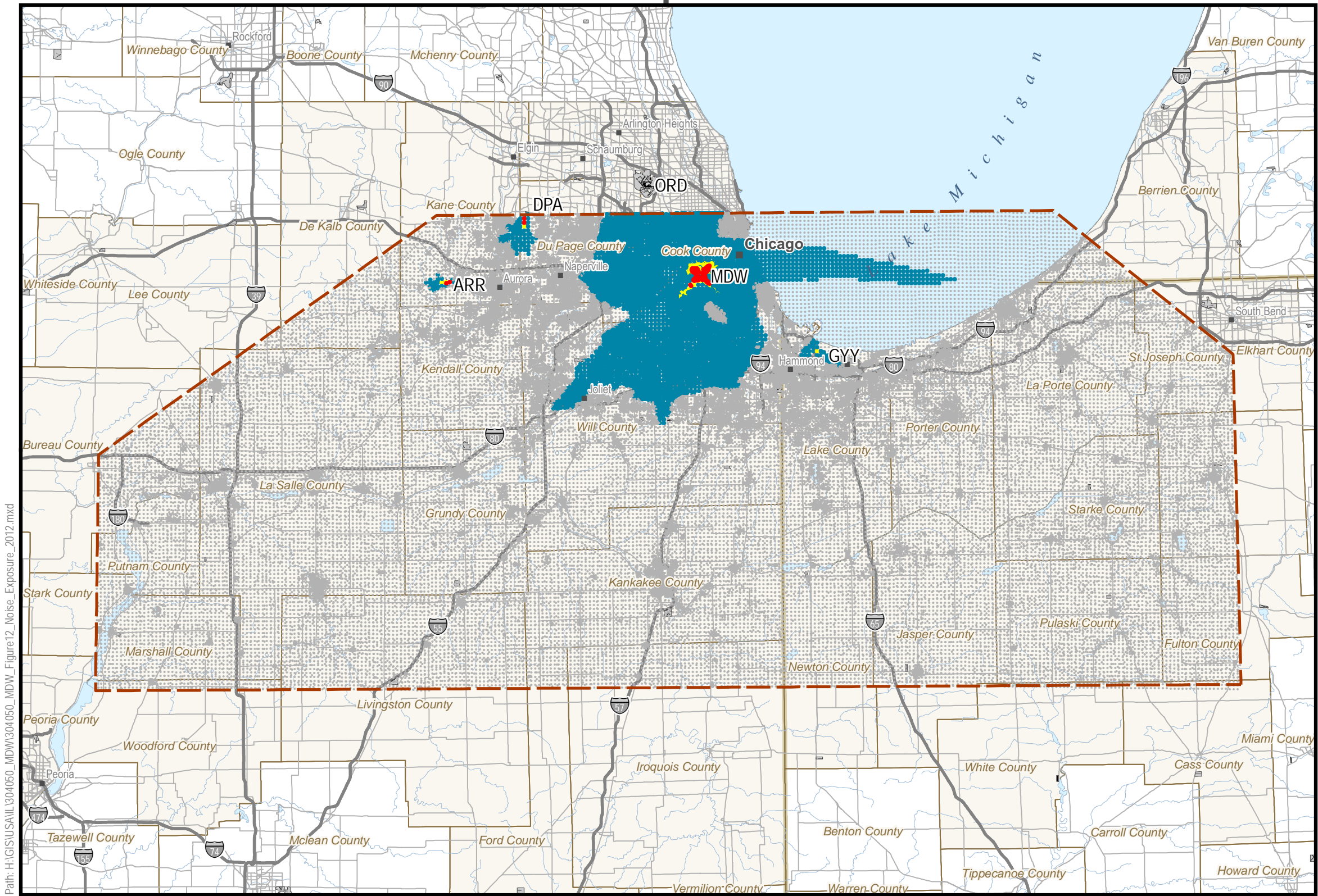
- DNL < 45.0 dB
- DNL 45.0 - 60.0 dB
- DNL 60.0 - 65.0 dB
- DNL > 65.0 dB

- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

Figure 12

Population Exposed to Aircraft Noise under Existing Conditions (2012)



Path: H:\GIS\USANIL\304050_MDW\Figure12_Noise_Exposure_2012.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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4.3.2 Compatible Land Use

This section describes land cover classifications located throughout the study area and compatible land use analysis in the immediate vicinity of MDW.

4.3.2.1 Definition of Impact Category

FAA Order 1050.1E addresses land use compatibility as an issue that normally arises in conjunction with airport development projects. Such projects tend to affect noise levels in close proximity to runway ends where exposure is highest. Guidelines for determining the compatibility of different uses with those noise levels are contained in the *Code of Federal Regulations*, Title 14, Part 150. FAA Order 1050.1E cites those guidelines as well (see Appendix E.3).

14 CFR Part 150 sets forth the regulations and guidelines for Airport Sponsors to undertake airport noise compatibility planning. Part 150 establishes a single methodology for measuring aircraft noise, determining noise exposure, and identifying land uses that are normally compatible with various levels of noise exposure. The purpose of conducting a Part 150 study at an airport is to develop a balanced, cost-effective plan to reduce current aircraft noise impacts over noise-sensitive land uses and, where practical, to limit the potential for future noise impacts. The general goals and objectives addressed in a Part 150 Study include:

- Reduce, where feasible, existing and forecasted noise levels over existing noise-sensitive land uses.
- Reduce the introduction of new noise-sensitive land uses near the Airport.
- Mitigate, where feasible, adverse noise impacts in accordance with Federal guidelines.
- Provide mitigation measures that are sensitive to the needs of the community and its stability.
- Minimize the impact of mitigation measures on local tax bases.
- Remain consistent, where feasible, with local land use planning and development policies.

Land uses are normally considered compatible with noise levels less than DNL 65 dB.

4.3.2.2 Existing Conditions

This section presents the information on land uses in the immediate vicinity of MDW. For those portions of the study area that are not in the immediate vicinity, more generalized land cover data are presented.

MDW Environs

Identifying and evaluating all land uses within the airport environs is necessary to quantify residential and other noise-sensitive land uses impacted by aircraft noise. As discussed above, the FAA has developed land use compatibility guidelines relating types of land use to airport sound levels. These guidelines show the compatibility parameters for residential, public facilities (e.g., schools, churches, nursing homes, hospitals, and libraries), commercial, manufacturing and production, and recreational land uses. In general, the guidelines indicate

that noise sensitive land uses (i.e., residential and noise-sensitive public facilities) are considered incompatible with airport operations within the 65 DNL noise exposure contour, unless treated with some type of mitigation. All land uses exposed to noise levels below 65 DNL are generally considered by the FAA to be compatible with airport operations. As noted, with some exceptions for land use where a quiet setting is a generally recognized purpose and attribute, the compatibility guidelines state that all noise sensitive land use is compatible with DNL values less than 65 dB.

In notes to its land use compatibility guidelines, FAA indicates that residential uses and schools can be compatible with DNL values higher than 65 dB if appropriate sound insulation treatments are applied. According to a CDA study, there are 7,208 housing units exposed to DNL values equal to or greater than 65 dB (see Table 5). The City of Chicago has engaged in a large residential and school sound insulation program starting in 1996 and 4,874 homes were treated as of Program Year 2011. An additional 21 housing units are in progress of being insulated and 1,002 housing units previously have declined participation in the program. This leaves 1,332 housing units potentially eligible for participation.⁵²

Study Area beyond MDW Environs

The FAA obtained land cover data for the study area from the United States Geological Survey (USGS) National Land Cover Database 2006.⁵³ Land use classifications within the study area include developed (e.g., low, medium, and high intensities, and open space), pastures, cultivated crops, shrub/scrub lands, grasslands, forested lands, wetlands, barren lands, and open water. Developed land use occurs primarily within and adjacent to the City of Chicago metropolitan area (including Gary, Indiana), and Planted/Cultivated and Shrub/Scrub/Grassland land uses occur in rural areas. Figure 13 illustrates general land cover classification within the study area.

⁵² CDA, “2013 Part 150 Study Update.”

⁵³ USGS, “National Land Cover Database (NLCD),” 2006: <http://www.mrlc.gov/>

Chicago Midway

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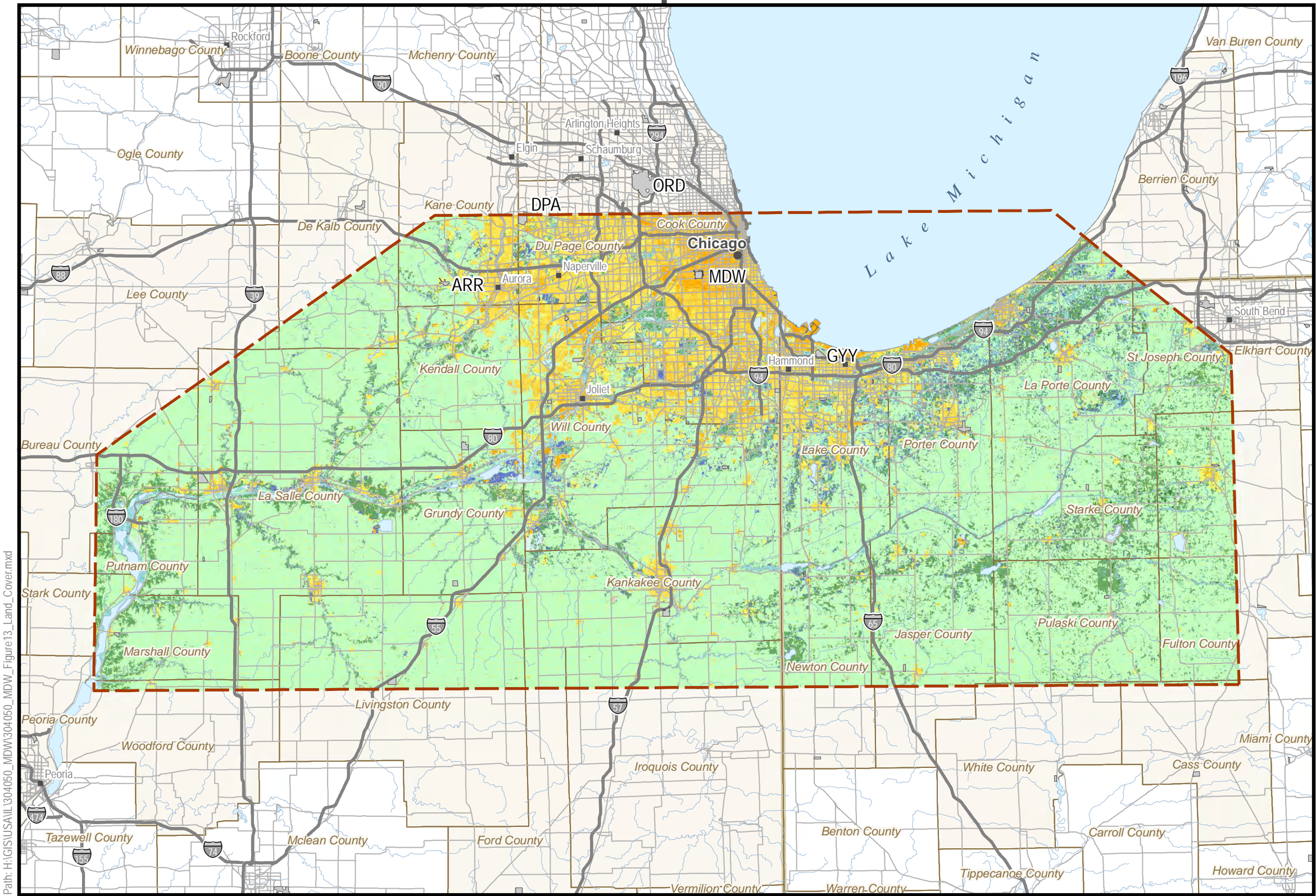
- Study Area Boundary
- Airports

National Land Cover Classification

- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub/Grassland/Herbaceous
- Pasture Hay / Cultivated Crops
- Wetlands

- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

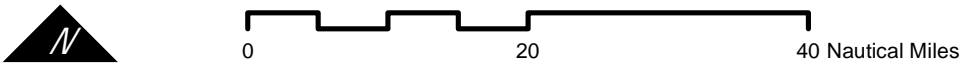
Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport



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Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; Multi-Resolution Land Characterization (MRLC) consortium (NLCD2006 Land Cover) January 28, 2013; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

Figure 13
Land Cover under Existing Conditions (2012)



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As shown in Figure 13, the study area includes over 10,000 NM² of a multi-state area spanning portions of Illinois, Indiana, and Michigan. The greater Chicago region, which includes the northeast Illinois/northwest Indiana metropolitan area, constitutes the center of the study area. The greater Chicago region includes eleven counties that are included within the study area, including Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, and Will Counties in northeastern Illinois; and Lake and Porter Counties in northwestern Indiana. The remaining counties within the study area, in part or whole, include Bureau, Lee, Marshall, Putnam, Ford, Iroquois, La Salle, Livingston, and Woodford counties within the state of Illinois; Jasper, LaPorte, Newton, Pulaski, Starke, White, Cass, Fulton, Marshall, St. Joseph within the state of Indiana; and Berrien county within the state of Michigan.

The Study Area exhibits a well-defined land use pattern. The high-intensity developed land uses occur primarily within and adjacent to the Chicago metropolitan area. There is a transition to low-intensity developed, cultivated, and natural land uses as distance from the City of Chicago increases. Developed land uses persist farther from the city along the major roadway corridors. Natural land uses are concentrated most heavily around the surface water features (e.g., rivers, lakes) and within area parks. Cultivated croplands make up the largest part of the land use in the study area. The open water land use associated with Lake Michigan is a large part of the land use in the northeastern portion of the study area, from the east side of the City of Chicago continuing east to the shores of Indiana and Michigan. Table 8 lists the various land uses and their approximate areas, in square miles and acres, within the study area.

Table 8 Generalized Land Cover Classifications within the Study Area

Category	Area (sq. mi)	Area (ac)
Barren Land (Rock/Sand/Clay)	19	12,383
Cultivated Crops	5,954	3,810,400
Deciduous Forest	777	497,326
Developed, High Intensity	173	110,980
Developed, Low intensity	897	574,067
Developed, Medium Intensity	362	231,715
Developed, Open Space	501	320,388
Emergent Herbaceous Wetlands	28	17,915
Evergreen Forest	13	8,164
Grassland/Herbaceous	234	149,904
Mixed Forest	21	13,131
Open Water	851	544,458
Pasture/Hay	290	185,776
Shrub/Scrub	52	33,540
Woody Wetlands	242	154,953
TOTAL	10,414	6,665,100
Note: Table revised as errata subsequent to publication of Draft EA. Source: Harris Miller Miller & Hanson, 2013		

4.3.3 Department of Transportation Act, Section 4(f) Resources

This section includes a brief synopsis of the protections afforded to publicly owned parks, recreation areas, wildlife and waterfowl refuges, and public or private historic sites under Section 4(f) of the *Department of Transportation (DOT) Act of 1966*. As with compatible land use (see Section 4.3.2), the FAA assesses this impact category in terms of the effects that aircraft noise may have on these properties, since the Proposed Action does not include construction or land-disturbing activities that could affect properties protected under Section 4(f).

4.3.3.1 Definition of Impact Category

Section 4(f) of the *Department of Transportation (DOT) Act* states that the “Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and the project includes all possible planning to minimize harm resulting from the use.” The term “use” encompasses both direct physical taking of Section 4(f) lands (i.e., permanent or temporary incorporation or occupancy of land as part of a transportation project) as well as “constructive” use of such lands. Constructive use occurs when the proximity impacts (e.g., noise) of a proposed project adjacent to, or near, a Section 4(f) property result in substantial impairment of the property. Substantial impairment occurs only when the activities, features, or attributes of the Section 4(f) property that contribute to its significance or enjoyment are substantially diminished. Substantial impairment would occur when impacts to Section 4(f) lands are sufficiently serious that the value of the site in terms of its prior significance and enjoyment are substantially reduced or lost. With respect to aircraft noise, for example, the noise must be at levels high enough to have negative consequences of a substantial nature that amount to a taking of a park or portion of a park for transportation purposes. Privately owned parks, recreation areas, and wildlife refuges are not subject to Section 4(f). If the FAA determines there would not be substantial impairment of a Section 4(f) resource, the action would not constitute a constructive use and would not, therefore, invoke Section 4(f).

In determining whether a constructive use would occur because of aircraft noise, the FAA uses the guidelines for land use compatibility in Part 150 to the extent those guidelines are relevant to the value, significance, and enjoyment of the Section 4(f) lands in question.⁵⁴ When assessing use of Section 4(f) properties located in a quiet setting, where the setting is a generally recognized feature or attribute of the site’s significance, the FAA carefully evaluates reliance on the Part 150 guidelines. Additional factors are weighed in determining whether to apply the thresholds listed in Part 150 guidelines to determine the significance of noise impacts on noise sensitive areas within national parks, national wildlife refuges, and historic sites, including traditional cultural properties. The FAA consults appropriate Federal, state, and local officials having jurisdiction over the affected Section 4(f) resources when determining whether project-related noise impacts would substantially impair the resource.

Some Section 4(f) properties are also subject to Section 6(f) of the *Land and Water Conservation Fund (LWCF) Act of 1975*.⁵⁵ Section 6(f) states that no public outdoor recreation areas acquired or developed with any LWCF assistance can be converted to non-recreation uses without the approval of the Secretary of the Interior. The Secretary of the Interior may only approve conversions if they are in accordance with the comprehensive statewide outdoor recreation plan and if other recreation lands of reasonably equivalent usefulness and location will replace the converted areas.

A review of available information from the NPS, state governments, local municipalities, and other reasonably available sources documented the location of public parks, recreation areas, refuges, and historic sites within the study area. The Section 4(f) resources evaluated as part of

⁵⁴ *Code of Federal Regulations*, Land Use Compatibility with Yearly Day-Night Average Sound Levels, Title 14, sec. 150, App. A, Table 1.

⁵⁵ *U.S. Code*. Title 16, sec. 450.

this EA are described and in Section 4.3.3.2 and listed in Appendix F, *Inventory of Department of Transportation Act, Section 4(f) Resources and Noise Exposure*.

4.3.3.2 Existing Conditions

This section presents information regarding potential 4(f) resources located within the study area, both in the immediate vicinity of MDW and beyond.

MDW Environs

This portion of the study area includes seven municipal public parks located within, partially within, or immediately adjacent to the existing conditions (2012) DNL 65 dB noise exposure contour. The parks include Park No. 468, Park No. 528 (Marion Fathers), Minuteman Park, West Lawn Park, Strohecker Park, Lawler Park and Archer Park. Recreation facilities provided at these parks include baseball and softball fields, tennis courts, soccer fields, basketball courts, playgrounds, and open space. Archer Park and West Lawn Park (both located outside, but adjacent to the DNL 65 dB noise contour) offer indoor gymnasiums, after school programs, and special events.

Study Area beyond MDW Environs

This portion of the study area includes numerous Federal, state, county, and city parks, as well as other potential Section 4(f) resources.⁵⁶ Figure 14 depicts the Federal and state resources. FAA identified 2,281 potential Section 4(f) resources (approximately 1,685 public parks and 596 historic sites) within the study area (see Appendix F).⁵⁷ The FAA identified these resources to assist in characterizing conditions in the existing environment. These resources include four national resources, 12 state parks and 31 state recreation areas, numerous local parks and recreation areas, and 596 historic sites. Figure 14 depicts the locations of the national and state parks, wildlife refuges, trails, and recreation areas located within the study area.

⁵⁶ The FAA collected data on publicly owned parks, refuges, National Atlas, , US Fish & Wildlife Service, United States Department of Agriculture, National Park Service, and the Environmental Systems Research Institute (ESRI).


⁵⁷ FAA has not determined that these resources qualify for protection under Section 4(f); therefore, they are considered “potential” Section 4(f) resources.


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
Legend:


- 


Study Area Boundary
- 


Airports
- 


National Park or Forest
- 


State Park or Forest
- 


County Park; Regional Park; Local Park
- 


Illinois and Michigan Canal - National Heritage Corridor
- 


Major Cities
- 


Detailed Cities
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Highways
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Secondary Highways
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Counties within Study Area Boundary
- 

State Boundary
- 

County Boundary
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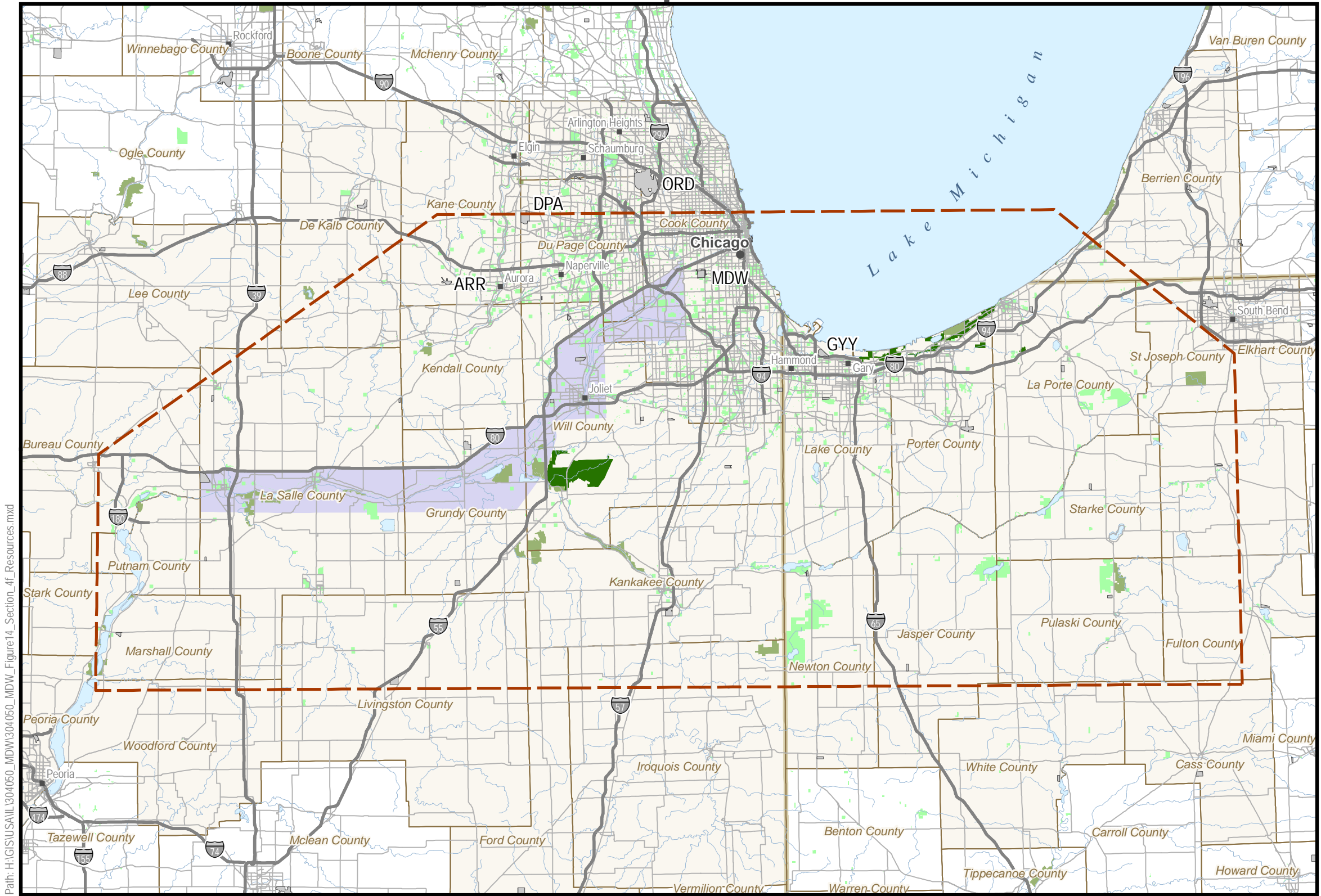
Water Body
- 

Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

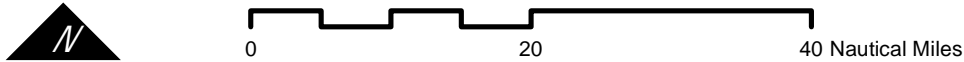
Figure 14

Potential Department of Transportation Act,
Section 4(f) Resources



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Data Source: Environmental Systems Research Institute, Inc. (ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); US Fish & Wildlife Service (National Wildlife Refuge) November 15, 2012; US Department of Agriculture (National Forest) June 13, 2012; National Park Service (National Park Service Boundary) February 10, 2012; Michigan Department of Technology, Management & Budget (State Recreational Area) July 13, 2012; Illinois Department of Natural Resources (State Recreational Area) April 9, 2012; Indiana Map (State Recreational Area) April 3, 2012; US Fish & Wildlife Service (Critical Habitat Area) March 16, 2012
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Section 6(f) of the LWCF Act provides funding for the purchase and improvement of recreational lands, wildlife and waterfowl refuges, and other similar resources. The LWCF established a fund for Federal acquisition of park and recreational lands and provides matching grants to state and local governments for recreation planning, acquisition, and development. Lands purchased by this fund are protected from conversion to uses other than public outdoor recreation. The inventory of Section 4(f) resources in this section of the EA incorporates the identification of any Section 6(f) resource included within the appropriate study area.

National Resources

The national resources include a national heritage corridor, a national lakeshore, and a national tallgrass prairie. A brief description of these national resources is provided below.

Illinois & Michigan Canal National Heritage Corridor – The Illinois & Michigan Canal was built in the 1830s and 1840s along the portage between Lake Michigan and the Illinois River, which had long been used as a Native American trade route. The canal rapidly transformed Chicago from an isolated crossroads into a critical transportation hub between the east and the developing Midwest. The national heritage corridor was designated 1984 and provides a variety of heritage, historic, and recreation opportunities.

Indiana Dunes National Lakeshore – Indiana Dunes National Lakeshore encompasses approximately 15 mi. (15,000 acres) of Lake Michigan shoreline within the State of Indiana. The lakeshore contains unique ecosystems and provides multiple recreational and educational opportunities that include bird watching, nature education programs, swimming, camping, fishing, and hiking.

Midewin National Tallgrass Prairie – Midewin National Tallgrass Prairie is the first national tallgrass prairie and, at 19,000 acres, is the largest piece of contiguous open space in northeastern Illinois. The national tallgrass prairie offers recreational activities, such as hiking, biking, horseback riding, bird watching, and hunting.

Chautauqua National Wildlife Refuge – The Cameron-Billsbach Unit, a division of the Chautauqua National Wildlife Refuge, is located within the study area, located near Henry, Illinois. The Chautauqua Refuge is situated in the middle of the Mississippi Flyway along the Illinois River. The USFWS notes that the refuge is an important link in the chain of resting and feeding areas for waterfowl and other migratory birds in the flyway. The refuge has been designated a Globally Important Bird Area and a Western Hemisphere Shorebird Reserve Network site.

Existing Noise Exposure

MDW Environs

For potential Section 4(f) resources located within, partially within, or immediately adjacent to the existing conditions (2012) DNL 65 dB noise exposure contour, aircraft noise levels were calculated using the FAA's INM noise model. The aircraft noise levels for these seven locations ranged from DNL 58.1 dB to 66.6 dB.

Study Area beyond MDW Environs

For each resource beyond MDW environs, the FAA modeled the existing conditions (2012) aircraft noise levels for potential Section 4(f) locations within the study area at one or more grid

points. The aircraft noise levels for these locations, modeled using NIRS, varied depending on the property's proximity to a nearby airport. DNL values for the 4,596 grid points ranged from DNL 23.5 dB to 62.2 dB. The FAA also computed the existing conditions (2012) aircraft noise levels for national parks and wildlife refuges. As previously mentioned, noise modeling for these points was extended up to an altitude of 18,000 ft. AGL. The noise levels for the 48 grid points representing the Illinois Canal Heritage Corridor, the Indiana Dunes National Lakeshore, and the Midewin National Tallgrass Prairie are presented below:

- Illinois Canal Heritage Corridor (all units) – noise exposure ranges from DNL 29.1 dB to 37.4 dB
- Indiana Dunes National Lakeshore (all units) – noise exposure ranges from DNL 28.6 dB to 41.4 dB
- Midewin National Tallgrass Prairie (all units) – noise exposure ranges from DNL 38.5 dB to 42.2 dB

Appendices E.3 and F provide additional information, including a summary of the modeled noise exposure values at the grid points.

The FAA modeled the existing conditions (2012) aircraft noise levels for historic resources, which may also be potential Section 4(f) resources, within the study area at one or more grid points. The modeled aircraft noise levels for these locations varied depending on the property's proximity to a nearby airport. The DNL values for the 596 grid points ranged from DNL 25.1 dB to 55.9 dB. See Section 4.3.1 and Appendix F for additional information related to aircraft noise.

4.3.4 Historical, Architectural, Archeological, and Cultural Resources

This section presents information on the presence of known historical, architectural, archaeological, and cultural resources that the Proposed Action could affect. Similar to the manner in which aircraft noise influences the analysis of compatible land use and DOT Section 4(f) properties, an assessment of the effects that the Proposed Action may have on historical, architectural, and cultural uses occurs primarily in the context of the effects that aircraft noise could have on these resources. As the Proposed Action would not involve ground disturbance, the FAA did not address archaeological resources in this EA.

4.3.4.1 Definition of Impact Category

The *National Historic Preservation Act of 1966 (NHPA)* requires the FAA to consider the effects of its undertakings on properties in or eligible for listing in the National Register of Historic Places (NRHP). The NHPA requires the Secretary of the Interior to establish standards by which individual resources (both archaeological and architectural) are evaluated to determine their eligibility for listing on the NRHP, including buildings, sites, objects, and structures. These resources are placed on the NRHP in reference to their (1) association with events that have made a significant contribution to the broad patterns of American history, (2) association with the lives of persons significant in our past, (3) architectural or archaeological significance, and/or (4) ability to yield information important in prehistory or history.

Compliance with Section 106 of the NHPA may require consultation with the the Advisory Council on Historic Preservation (ACHP) and/or the State Historic Preservation Officer (SHPO) if a Federal undertaking has a potential for an adverse effect to historic properties on or eligible for listing on the NRHP.

The Proposed Action (changes to air traffic procedures), is an undertaking under the meaning of *Code of Federal Regulations*, Title 36, sec. 800.16(y). Federal regulations define the area of potential effect (APE) as the geographic area or areas within which an undertaking, such as the Proposed Action, may directly or indirectly cause changes in the character or use of historic properties.⁵⁸ The APE for historical, architectural, and cultural resource properties is confined to those portions of the study area where the aircraft DNL is at or above 45 dB.

4.3.4.2 Existing Conditions

This section presents the information on potential 4(f) resources located within the study area, both in the immediate vicinity of MDW and beyond.

Midway Airport Environs

Historic and cultural resources in the vicinity of MDW were identified in the “2013 Part 150 Study Update.” The Part 150 study identified sites and historic districts that are included on the National Register of Historic Places (NRHP), City of Chicago Landmark Database, or the City of Chicago Historical Survey Database. Historically significant structures on MDW property include the Illinois National Guard Armory. Four addresses are characterized as historic sites within the existing conditions (2012) NEM. Ninety-five (95) total historic sites are located within the study area established for the Part 150 study. The historic sites located within the existing conditions (2012) DNL 65 dB noise exposure contour are listed in Table 9.

Table 9 Historic Sites within the Midway Airport Existing Conditions (2012) Noise Exposure Map

Map ID	Historic Site
HP-1	5046 S. Kolin Ave., Chicago
HP-2 ¹	5600-08 W. 63rd St., Chicago
HP-3 ¹	6248-58 S. Central Ave., Chicago
HP-4	Illinois National Guard Amory
Note: 1. HP-2 and HP-3 represent the same property. Source: CDA, “2013 Part 150 Study Update”	

Study Area beyond Midway Airport Environs

The Proposed Action would only involve changes in aircraft routing and would not involve land acquisition or construction that could cause physical destruction of, alterations to, or relocations to any properties or resources listed, or eligible for listing, in the NRHP, or its state-level equivalents maintained by a SHPO.

Historic and cultural resources in the study area that are listed in the NRHP were identified through a review of a downloadable spatial database prepared and maintained by the NPS. The information in the NPS database was analyzed using GIS software. The analysis shows 624 National Register resources within the study area. The distribution of the historic and cultural resources among the three states within the study area is as follows: Illinois – 485, Indiana – 136, and Michigan – 3. The density of historic and cultural resources is greatest in and around Chicago. Figure 15 depicts the locations of the historic and cultural resources. Appendix G, *Inventory of Historic Resources and Noise Exposure* provides a list of the historic and cultural resources located within the study area.

⁵⁸ *Code of Federal Regulations*, Title 36, sec. 800.16(d).

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Chicago Midway

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Legend:

- Study Area Boundary
- Airports
- National and/or State Listed Historic Place
- National and/or State Listed Historic District
- Illinois and Michigan Canal - National Heritage Corridor
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Railroad
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:

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ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

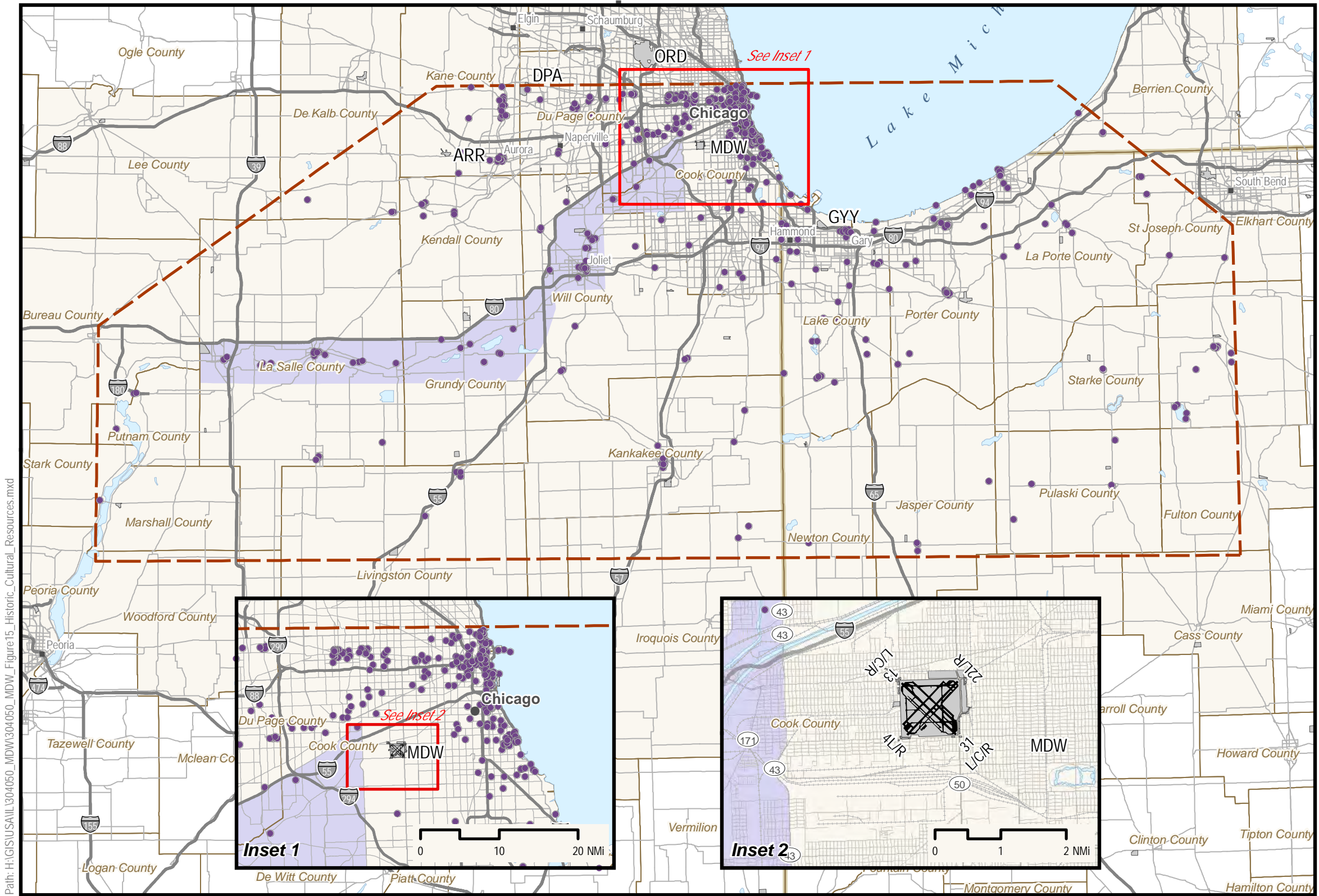


Figure 15

Historical and Cultural Resources



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Of the 624 National Register resources discussed above, 50 of the resources are also designated as National Historic Landmarks. National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. Appendix G also identifies the National Historic Landmarks.

A search of available GIS databases did not identify any Native American Lands within the study area.

4.3.5 Air Quality

This section describes the legislative and regulatory directives that protect air quality. It also addresses the framework for assessing the effects that the Proposed Action may have on air quality and the presence of existing pollutants in all or portions of the 31 counties within the study area. This section also includes a description of the current EPA attainment status designations (i.e., areas meeting or not meeting national air quality standards) and a summary of local air monitoring data.

4.3.5.1 Definition of Impact Category

Pursuant to the *Federal Clean Air Act of 1970 (CAA)*,⁵⁹ the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for major pollutants, called “criteria pollutants.” Currently there are six criteria pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), and lead (Pb). Particulate matter includes particles with a diameter less than 10 micrometers (PM₁₀) and with a diameter of less than 2.5 micrometers (PM_{2.5}).

Table 10 shows the primary and secondary NAAQS for the criteria pollutants.⁶⁰ The NAAQS are two-tiered, with the first tier (primary) intended to protect public health and the second tier (secondary) intended to prevent further degradation of the environment.

⁵⁹ *U.S. Code*, Title 42, sec. 7401-7676.

⁶⁰ *Code of Federal Regulations*, Title 40, Part 50.

Table 10 National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standards ^[1,2]	Secondary Standards ^[1,3]
CO	8- hour	9 ppm	None
	1- hour	35 ppm	None
Lead ^[4]	Rolling 3-Month Average	0.15 µg/m ³	Same as Primary
NO ₂	Annual Arithmetic Mean	0.053 ppm	Same as Primary
	1-hour	0.100 ppm ^[5]	None
PM ₁₀	Annual Arithmetic Mean	None	None
	24-hour	150 µg/m ³	Same as Primary
PM _{2.5}	Annual Arithmetic Mean	15 µg/m ³	Same as Primary
	24-hour	35 µg/m ³	Same as Primary
O ₃	8-hour (2008 standard)	0.075 ppm ^[8]	Same as Primary
	8-hour (1997 standard)	0.08 ppm ^[9]	Same as Primary
	1-hour	0.12 ppm ^[6]	Same as Primary
SO ₂	1-hour	75 ppb ^[7]	None
	3-hour		0.5 ppm

ppm – parts per million
ppb – denotes parts per billion
µg/m³ – denotes micrograms per cubic meter

Notes:

1. National standards (other than ozone, particulate matter, and those based on annual averages) are not to be exceeded more than once per year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or is less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per CY with a 24-hour average concentration above 150 µg/m³ is equal to or is less than one. For PM_{2.5}, the 24-hour standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or are less than the standard.
2. Primary Standards: Levels necessary to protect public health with an adequate margin of safety.
3. Secondary Standards: Levels necessary to protect the public from any known or anticipated adverse effects.
4. Lead is categorized as a “toxic air contaminant” with no threshold exposure level for adverse health effects determined.
5. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.
6. EPA has revoked the 1-hour ozone standard in all areas within the study area.
7. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.
8. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
9. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

The standards in Table 10 apply to the concentration of a pollutant in outdoor ambient air. If the air quality in a geographic area meets or exceeds the national standard, it is designated as an attainment area. Areas that do not meet the national standard are designated as non-attainment areas. If there is insufficient information to classify an area as non-attainment for a particular air pollutant, the area is designated unclassifiable/attainment for that pollutant. Once a non-attainment area meets the air quality standards, the EPA will designate the area as a “maintenance area.”

Each state is required to draft a State Implementation Plan (SIP) to improve the air quality further in non-attainment areas and to maintain the air quality in attainment and maintenance areas. The SIP outlines the measures that the state will take in order to improve air quality.

4.3.5.2 Existing Conditions

Table 11 presents the EPA-designated attainment status for the counties, in part or whole, within the study area.

Table 11 EPA Designated Attainment Status within the Study Area

County	Pollutant ¹	Designated Attainment Status ^{4,5,6}
Illinois		
Bureau	All	Attainment
Lee	All	Attainment
Marshall	All	Attainment
Putnam	All	Attainment
Cook	Ozone 8-hour (1997) ² Ozone 8-hour (2008) ³ Lead (2008)(P) PM10(P) PM2.5	Moderate Marginal Non-Attainment(P) Maintenance(P) Non-Attainment
De Kalb	All	Attainment
Du Page	Ozone 8-hour (1997) ² Ozone 8-hour (2008) ³ PM2.5	Moderate Marginal Non-Attainment
Ford	All	Attainment
Grundy	Ozone 8-hour (1997) ² (P) Ozone 8-hour (2008) ³ (P) PM2.5(P)	Moderate(P) Marginal(P) Non-Attainment(P)
Iroquois	All	Attainment
Kane	Ozone 8-hour (1997) ² Ozone 8-hour (2008) ³ PM2.5	Moderate Marginal Non-Attainment
Kankakee	All	Attainment
Kendall	Ozone 8-hour (1997) ² (P) Ozone 8-hour (2008) ³ (P) PM2.5(P)	Moderate(P) Marginal(P) Non-Attainment(P)
La Salle	PM-10(P)	Non-Attainment(P)
Livingston	All	Attainment
Will	Ozone 8-hour (1997) ² Ozone 8-hour (2008) ³ PM2.5	Moderate Marginal Non-Attainment
Peoria	SO2(P)	Maintenance(P)
Woodford	All	Attainment
Indiana		
Jasper	All	Attainment
Lake	Ozone 8-hour (1997) ² Ozone 8-hour (2008) ³ CO(P) PM10(P) PM2.5 SO2	Maintenance Marginal Maintenance(P) Maintenance(P) Maintenance Maintenance(P)
LaPorte	All	Attainment
Newton	All	Attainment
Porter	Ozone 8-hour (1997) ² Ozone 8-hour (2008) ³ PM2.5	Maintenance Marginal Maintenance
Pulaski	All	Attainment
Starke	All	Attainment
White	All	Attainment
Cass	All	Attainment
Fulton	All	Attainment
Marshall	All	Attainment
St. Joseph	Ozone 8-hour (1997) ²	Maintenance
Michigan		
Berrien	Ozone 8-hour (1997) ²	Maintenance

County	Pollutant ¹	Designated Attainment Status ^{4,5,6}
Notes: <ul style="list-style-type: none"> Ozone 8-hour (1997) denotes attainment status with the 1997 standard. Ozone 8-hour (2008) denotes attainment status with the 2008 standard. Marginal Area for the 2008 standard has a design value of 0.076 up to but not including 0.086 ppm Moderate Area for the 1997 standard has a design value of 0.092 up to but not including 0.107 ppm. (P) denotes part of the county is designated non-attainment or maintenance. 		

As noted in Table 11, portions of the study area have been designated by EPA as being in non-attainment or maintenance for the 1997 and 2008 ozone standard, 2008 lead standard, and particulate matter (PM₁₀ & PM_{2.5}) standards. Parts of Lake and Peoria Counties are also designated maintenance for the carbon monoxide and sulfur dioxide standards. The remaining counties in the study area are in attainment of the NAAQSs for all criteria pollutants (i.e., carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), PM₁₀/PM_{2.5}, lead and ozone). A general description of the five criteria pollutants designated as non-attainment or maintenance is as follows:

- **Ozone** is found in two regions of the Earth's atmosphere – at ground level and in the upper regions of the atmosphere. Both types of ozone have the same chemical composition (O₃). While upper atmospheric ozone protects the earth from the sun's harmful rays, ground level ozone is the main component of smog. Tropospheric, or ground level, ozone is not emitted directly into the air, but is created by chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs). Ozone is likely to reach unhealthy levels on hot sunny days in urban environments and can be transported long distances by the wind. For this reason, even rural areas can experience high ozone levels.
- **Lead** is a naturally found metal in the environment as well as in manufactured products. Major sources of lead emissions have historically been from fuels in on-road vehicles using leaded gasoline along with industrial sources. EPA regulatory efforts dramatically reduced lead emissions from on-road vehicles by 95 percent between 1980 and 1999 through increased use of unleaded gasoline. Major sources of lead emissions today are from lead smelters, ore, and metals processing.
- **Particulate Matter** is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (e.g., nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Inhalable coarse particles such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. *Fine particles*, such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller. These particles can be directly emitted from sources such as forest fires or they can form when gases emitted from power plants, industrial equipment, and automobiles react in the air.
- **Carbon Monoxide** is a colorless, odorless gas emitted from combustion processes. Nationally and, particularly in urban areas, the majority of CO emissions to ambient air come from mobile sources, and to a significantly lesser degree, from stationary fuel combustion, solvents, fires, and industrial processes.
- **Sulfur dioxide** is a pollutant formed in the atmosphere as a result of the combustion process, mainly from the burning of fossil fuels containing sulfur compounds. Other sources of sulfur dioxide are from petroleum refining, manufacturing sulfuric acid and the

smelting of ores containing sulfur. The health effects of sulfur dioxide are irritation and inflammation of the tissues. When inhaled, bronchial constriction can occur resulting in an increased resistance to airflow and volume, which can increase the respiratory rate and heart rate.

4.3.6 Natural Resources, Energy Supply (Aircraft Fuel)

The natural resource and energy supply environmental impact category covers a wide range of activities. However, for the purposes of this EA, only aircraft fuel consumption is relevant. This section describes fuel consumption related to the existing movement of aircraft within the study area (and 10 NM outside the study area), using the same operational inputs as discussed in Section 4.3.1.

4.3.6.1 Definition of Impact Category

Executive Order 13123, *Greening the Government through Efficient Energy Management*, requires agencies to reduce petroleum use, air quality emissions, and water consumption.⁶¹ According to FAA Order 1050.1E and consistent with NEPA and CEQ regulations, it is also the policy of the FAA that all elements of the transportation system should be “designed with a view to their aesthetic impact, conservation of resources such as energy, pollution prevention, harmonization with community environment, and sensitivity to the concerns of the traveling public.”⁶² In addition, *Code of Federal Regulations*, Title 40, sec. 1502.16(e-f) requires Federal agencies to assess each alternative’s energy requirements, energy conservation, and the use of natural or consumable resources.

In determining the significance of impacts, FAA Order 1050.1E, Appendix A, Section 13 states, “For most actions, changes in energy demands or other natural resource consumption will not result in significant impacts. If an EA identifies problems such as demands exceeding supplies, additional analysis may be required in an EIS. Otherwise, it may be assumed that impacts are not significant.” In assessing the potential for significant impacts, this analysis considers the following factors in assessing the potential to cause demands that would exceed available or future natural resource or energy supplies:

- The action would cause a substantial demand on available energy or natural resource supplies.
- When compared with future no action conditions, changes in aircraft movements would cause a statistically significant increase in fuel consumption.

4.3.6.2 Existing Conditions

The FAA calculated aircraft fuel burn to estimate aircraft fuel consumption associated with air traffic flows in existing conditions (2012) using NIRS, which calculates fuel burn using the same input used for calculating aircraft noise. According to the NIRS calculation, approximately 172,654 Metric Tons (MT) of fuel were forecasted to be burned in 2012 by IFR aircraft arriving

⁶¹ U.S. Department of Energy (DOE), Executive Order 13123, “Greening the Government through Efficient Energy Management: Guidance Documents for Federal Agencies,” December 2000.

⁶² FAA Order 1050.1E, App. A, sec. 13.1b, p. A-58.

at and departing from MDW, while in flight through the study area (and 10 NM outside the study area).⁶³

4.3.7 Climate

This section presents a discussion of global climate change as it relates to aircraft emissions of greenhouse gases (GHGs). It also provides the calculated GHG emissions based on estimated aircraft fuel burn for existing conditions (2012), as derived in Section 4.3.6.

4.3.7.1 Definition of Impact Category

The CEQ affirms the need to describe GHG emissions and their effect on climate as part of the NEPA analysis.⁶⁴ Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, defines GHG emissions as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydro fluorocarbons (HFCs), and sulfur hexafluoride (SF₆). In accordance with CEQ's *Federal Greenhouse Gas Accounting and Reporting Guidance* (October 6, 2010),⁶⁵ and to provide a single metric that embodies all GHGs, emissions are reported in metric tons of carbon dioxide equivalent (MT CO₂e). It is important to note that for aircraft, CO₂ emissions are equivalent to CO₂e emissions because CO₂ is the only combustion product of the six GHGs in the CEQ document.

Research has shown there is a direct correlation between fuel combustion and GHG emissions. In terms of U.S. contributions, the General Accounting Office (GAO) reports that, according to EPA data, "domestic aviation contributes about 3 percent of the total carbon dioxide emissions" compared with other industrial sources (all other transportation – 20 percent; power generation – 41 percent).⁶⁶ The International Civil Aviation Organization (ICAO) estimates that GHG emissions from aircraft account for roughly 3 percent of all anthropogenic⁶⁷ GHG emissions globally.⁶⁸ Climate change due to GHG emissions is a global phenomenon, so the affected environment is the global environment.⁶⁹

The scientific community is continuing efforts to understand the impact of aviation emissions on the global atmosphere. The FAA is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in GHG emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating Federal agencies,⁷⁰ has developed the Aviation Climate Change Research Initiative (ACCRI) in an effort

⁶³ One metric ton (MT) = 1,000 kilograms (kg)

⁶⁴ FAA Order 1050.1E, Chg. 1, Guidance Memo#3, "Considering Greenhouse Gases and Climate under the National Environmental Policy Act (NEPA): Interim Guidance," January 12, 2012.

⁶⁵ Council on Environmental Quality (CEQ), *Federal GHG Accounting and Reporting, and Technical Support Document* (corresponding): <http://www.whitehouse.gov/administration/eop/ceq/sustainability/fed-ghg>.

⁶⁶ Government Accountability Office (GAO), "Aircraft Emissions Expected to Grow, but Technological and Operational Improvements and Government Policies Can Help Control Emissions," GAO-09-554, 2009.

⁶⁷ Anthropogenic emissions are those produced by human activities.

⁶⁸ Alan Melrose, "European ATM and Climate Adaptation: A Scoping Study", ICAO Environmental Report, 2010.

⁶⁹ "[Greenhouse] gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States." U.S. Environmental Protection Agency, Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 2-3, 2009: <http://epa.gov/climatechange/endangerment.html>

⁷⁰ Including the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the Department of Energy (DOE), and the EPA.

to advance scientific understanding of regional and global climate impacts of aircraft emissions. The FAA also funds the Partnership for Air Transportation Noise & Emissions Reduction (PARTNER) Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. ICAO is examining similar research topics at the international level.⁷¹

4.3.7.2 Existing Conditions

An analysis of existing conditions (2012) IFR operations, using the same operational inputs as discussed in Section 4.3.6.2, indicates that approximately 172,654 MT of fuel will be burned in 2012 by aircraft arriving at and departing from MDW.⁷² Aircraft in flight through the study area would account for emissions of 544,723 MT of CO₂e.

4.3.8 Fish, Wildlife, and Plants

This section provides a discussion of the existing biotic resources within the study area. As described in Chapter 3, *Alternatives*, the Proposed Action does not involve construction or land disturbing activities. Therefore, it would not result in the loss or disturbance of any terrestrial, aquatic, or marine habitats. For this reason, this section is limited to a discussion of avian or bat species that may be present within the study area.

4.3.8.1 Definition of Impact Category

Federal and State Listed Species

The *U.S. Endangered Species Act (ESA) of 1973*⁷³ protects threatened and endangered species of fish, wildlife, and plants. Endangered species are defined as those in danger of extinction throughout all or a significant portion of its range. Threatened species are defined as any species that are likely to become an endangered species, within the foreseeable future, throughout all or a significant portion of its range. Section 7 of the ESA applies to Federal agency actions and sets forth requirements for consultation to determine if the Proposed Action “may affect” a Federally listed endangered or threatened species. If an agency determines that an action authorized, funded, or carried out by the agency “may affect” a Federally listed threatened or endangered species, then Section 7(a)(2) requires consultation with the USFWS or the National Marine Fisheries Service (NMFS), as appropriate. This consultation is intended to ensure that the action is not likely to jeopardize the continued existence of the Federally listed species or result in the destruction or adverse modification of critical habitat. For avian and bat species, Section 7 consultation is conducted with the USFWS.

Pursuant to the *Fish and Wildlife Coordination Act (FWCA)*⁷⁴ and other statutes and regulations, FAA must also consider potential impacts of proposed actions on state-listed endangered and threatened species.

⁷¹ Lourdes Q. Maurice and David S. Lee, “Chapter 5: Aviation Impacts on Climate,” in *Final Report of the International Civil Aviation Organization (ICAO) Committee on Aviation and Environmental Protection (CAEP) Workshop*, October 29th – November 2nd 2007, Montreal:

http://www.icao.int/icao/net/cnfrst/CAEP_SG_20082/docs/Caep8_SG2_WP10.pdf

⁷² Fuel burn and CO₂ emissions are generated in NIRS. The formula to convert fuel burn to CO₂ emissions is Fuel (kilograms)*3.155 = CO₂.

⁷³ U.S. Code, Title 16, sec. 1531 et seq.

⁷⁴ U.S. Code, Title 16, sec. 661-667e.

The *Illinois Endangered Species Protection Act* was enacted in 1972.⁷⁵ The Act authorizes the Illinois Department of Natural Resources (DNR) to plan and implement a program for the conservation of endangered and threatened species through research, management, habitat protection, issuance of grants, and education of the public. The Illinois Endangered Species Protection Board determines which plant and animal species are threatened or endangered in the state and advises the DNR on means of conserving those species. The Board maintains a list of threatened and endangered species, which is reviewed and revised as necessary, at least once every five years. The list of endangered and threatened species is published by the DNR.

The State of Indiana, through its DNR, maintains a list of endangered, threatened, and rare species found in the state. Indiana Statute 14-22-34, *Nongame and Endangered Species Conservation*, authorizes the DNR to prepare a list of species and prohibits any form of possession of listed species, except by permit. The DNR reviews the list of endangered species at least every two years and makes amendments, as appropriate. A listing of Indiana's endangered, threatened, and rare species is published by the DNR.

Part 365, "Endangered Species Protection," of the *Natural Resource and Environmental Protection Act* directs the Michigan DNR to conserve and protect endangered and threatened species of fish, wildlife, and plants.⁷⁶ The DNR prepares a list of endangered and threatened species and conducts a review of the state list every two years. This list and other information on protected species are available on the DNR website. Since 2011, the DNR Environmental Review Program is no longer accepting review requests. Project review requests are now submitted to the Michigan Natural Features Inventory (MNFI), a program of the Michigan State University Extension. However, the DNR "Endangered Species Assessment" website remains available and provides information on listed species.

Migratory Birds

The *Migratory Bird Treaty Act of 1918 (MBTA)*, as amended, prohibits the pursuit, hunting, taking, and killing, or attempts to do the same of any migratory bird, or part of a bird including egg or nest, unless permitted by regulation.⁷⁷ It authorizes the Secretary of the Interior to enforce the law and establish regulations as necessary. Executive Order 13186, *Responsibilities of Federal Agencies To Protect Migratory Birds*, signed in January 2001, requires all Federal agencies to enact and implement Memoranda of Understanding (MOUs) with the USFWS to enhance programs to protect migratory birds and, in particular, species of concern.⁷⁸ The MBTA and Executive Order together require that Federal agencies ensure that their actions do not impact migratory bird species populations and that the effects of those actions on migratory birds be evaluated through the NEPA process.

Code of Federal Regulations, Title 50, sec. 10.13 lists the species defined as migratory birds and included for protection under the MBTA and Executive Order 13186.⁷⁹ 1,007 species are

⁷⁵ *Illinois Compiled Statutes*, Title 520.

⁷⁶ *Michigan Public Act*, Title 451.

⁷⁷ *U.S. Code*, Title 16, sec. 590z.

⁷⁸ USFWS, "Digest of Federal Resource Laws": <http://www.fws.gov/laws/lawsdigest/EO.htm#eo13186> (accessed June 13, 2012).

⁷⁹ John L. Trapp, "Bird Species of the United States and its Territories and Their Protection under the Migratory Bird Treaty Act," USFWS: <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/MBTAProtectedNonprotected.html> (accessed August 29, 2012).

listed for protection under the MBTA.⁸⁰ The MBTA and Executive Order 13186 protect nearly all bird species that occur in the study area, with the exception of those that do not migrate. Migration routes or “flyways” refer to the broad geographic corridors utilized by birds traveling from breeding to wintering grounds. The actual routes followed by a given migratory bird species differ by variables such as distance traveled, time of starting, flight speed, and geographic position and latitude of the breeding and wintering grounds.

4.3.8.2 Existing Conditions

As part of this assessment, the potential for Federal and state listed avian bird and bat species occurring within the study area was conducted by reviewing species accounts and agency listings using online Federal and state databases. Based on the data retrieved from the online databases, two (2) Federally listed (Piping Plover – *Charadrius melodus* and Indiana bat – *Myotis sodalis*) and 32 state-listed bird and bat species potentially occur within the study area. Table 12 lists the Federal and state-listed bird and bat species known to occur or which are listed species potentially occurring within the study area.

One listed bat species, the Federally- and state-listed Indiana bat (*Myotis sodalis*), has been documented inside the study area within the Pecumsaugan Creek – Blackball Mines Nature Preserve in La Salle County, Illinois, inside the Illinois and Michigan Canal National Heritage Corridor.⁸¹ Blackball Mine, an abandoned limestone mine, has been designated Critical Habitat for this species by the USFWS. This species also has documented statewide occurrences in Indiana and known occurrences in Berrien County, Michigan.⁸²

⁸⁰ USFWS, “Official Number of Protected Migratory Bird Species Climbs to More than 1,000”: <http://www.fws.gov/news/NewsReleases/showNews.cfm?newsId=1A6C3012-D22E-4F75-ABD98CD33992DD42> (accessed June 14, 2012).

⁸¹ Illinois DNR, 2012.

⁸² Michigan DNR, 2009.

Table 12 Threatened and Endangered Avian Species with the Potential to Occur within the Study Area

Common Name	Scientific Name	State Listing Illinois	State Listing Indiana	State Listing Michigan	Federal Listing
Birds					
American bittern	<i>Botaurus lentiginosus</i>	E	E	SC	
Barn owl	<i>Tyto alba</i>	E	E	E	
Black-crowned night heron	<i>Nycticorax nycticorax</i>	E	E	SC	
Black rail	<i>Laterallus jamaicensis</i>	E	E		
Black tern	<i>Chlidonias niger</i>	E	E	SC	
Cerulean warbler	<i>Dendroica cerulean</i>	T	E	T	
Common moorhen	<i>Gallinula chloropus</i>	E	E	T	
Golden-winged warbler	<i>Vermivora chrysoptera</i>		E		
Henslow's sparrow	<i>Ammodramus henslowii</i>		E	E	
King rail	<i>Rallus elegans</i>	E	E	E	
Least bittern	<i>Ixobrychus exilis</i>	T	E	T	
Little blue heron	<i>Egretta caerulea</i>	E			
Loggerhead shrike	<i>Lanius ludovicianus</i>	E	E	E (<i>migrans</i> only)	
Louisiana waterthrush	<i>Seiurus motacilla</i>			T	
Marsh wren	<i>Cistothorus palustris</i>		E	SC	
Northern harrier	<i>Circus cyaneus</i>	E	E	SC	
Osprey	<i>Pandion haliaeetus</i>	E	E	SC	
Peregrine falcon	<i>Falco peregrinus</i>	T	E	E	
Piping plover ¹	<i>Charadrius melodus</i>	E	E	E	E (Great Lakes population-Critical Habitat designated)
Prairie warbler	<i>Dendroica discolor</i>			E	
Red-shouldered hawk	<i>Buteo lineatus</i>		SSC	T	
Sedge wren	<i>Cistothorus platensis</i>		E		
Short-eared owl	<i>Asio flammeus</i>	E	E	E	
Snowy egret	<i>Egretta thula</i>	E			
Swainson's hawk	<i>Buteo swainsoni</i>	E			
Upland sandpiper	<i>Bartramis longicauda</i>	E	E		
Virginia rail	<i>Rallus limicola</i>		E		
Whooping crane	<i>Grus Americana</i>		E		Non-essential experimental population
Wilson's phalarope	<i>Phalaropus tricolor</i>	E	SSC	SC	
Yellow-crowned night heron	<i>Nyctanassa violacea</i>	E	E		
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	E	E	SC	
Yellow-throated warbler	<i>Dendroica dominica</i>			T	
Bats					
Indiana bat ²	<i>Myotis sodalist</i>	E	E	E	E
Legend: <ul style="list-style-type: none"> E- Endangered T-Threatened Notes: <ul style="list-style-type: none"> Piping Plover: Illinois, known occurrences in Cook County; Indiana, critical habitat designated in Porter County at Indiana Dunes State Park/National Seashore; Michigan, known occurrences in Berrien County Indiana bat: Illinois, known occurrence in La Salle County-Blackball Mine, designated critical habitat; Indiana, statewide known occurrences; Michigan, known occurrences in Berrien County Sources: <ul style="list-style-type: none"> Illinois Endangered Species Protection Act, 1972. Source P.A. 77-2186. Illinois DNR (2011), Indiana DNR (2010 and 2011), and Michigan DNR (2009). 					

Common Name	Scientific Name	State Listing Illinois	State Listing Indiana	State Listing Michigan	Federal Listing
<ul style="list-style-type: none"> Michigan's Natural Features Inventory, 2009. USFWS, 2012a, Species Reports, Listings, and Occurrences for Indiana, Illinois, and Michigan. 					

Forty-three bird (43) species and six bat species are specifically noted to occur within the counties, in part or whole, within the study area. Of these species, 32 bird and one bat species are Federally or state listed as Threatened or Endangered. Eleven bird and five bat species are also state listed as Species of Concern.

Migratory Birds

The *Migratory Bird Treaty Act*⁸³ and Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, state that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected within the United States. This is, in part, to ensure that environmental analyses of Federal actions required by NEPA or other established environmental review processes evaluate the effects of agency actions and agency plans on migratory birds. Therefore, this Act protects almost all birds that occur or migrate through the study area.

Birds migrate along four main migration routes or flyways in North America: the Atlantic, the Central, the Mississippi, and the Pacific flyways (illustrated in Figure 16). The term "Migration Route" is a generalization referring to the general movement of a species, rather than an exact course followed by individual birds. In addition, different species choose different routes. Differences between species may include start time, speed of flight, distance traveled, and latitude of breeding and wintering grounds. By watching patterns of banded birds, the migration data can be interpolated to gain insight into the direction of movement and broad regular paths of specific bird species, while keeping in mind that individuals may occur well outside of known migration routes.⁸⁴

As shown in Figure 16, the study area is wholly located within the Mississippi Migration Flyway, a bird migration flyway extending from the Arctic coast of Alaska to southern Ontario to Western Lake Erie, then southwesterly across Ohio and Indiana to the Mississippi River where it follows the river to its mouth, then into Central and South America. About 40 percent of all North American waterfowl use the Mississippi River as a migratory flyway, and 326 species of birds (one-third of all species in North America) use the Mississippi Flyway river corridor as a flyway for fall and spring migrations.⁸⁵

Because the Mississippi Flyway is relatively flat and the area is well watered, it supports a large host of migrating birds including waterfowl (Mid-America Hunting Association, 2012; Ducks Unlimited, 2012,). Soaring birds, such as hawks and vultures, that move along this flyway travel at altitudes usually below 3,000 ft. AGL. Waterfowl may migrate at varying altitudes, from 300 to 10,500 ft. Songbirds tend to migrate at night 6,000 to 12,000 ft. over water, and much lower over land, between 2,100 to 2,400 ft. (Cornell, 2007).












⁸³ U.S. Code, Title 16, sec. 703 et seq.

⁸⁴ USGS, 2006.

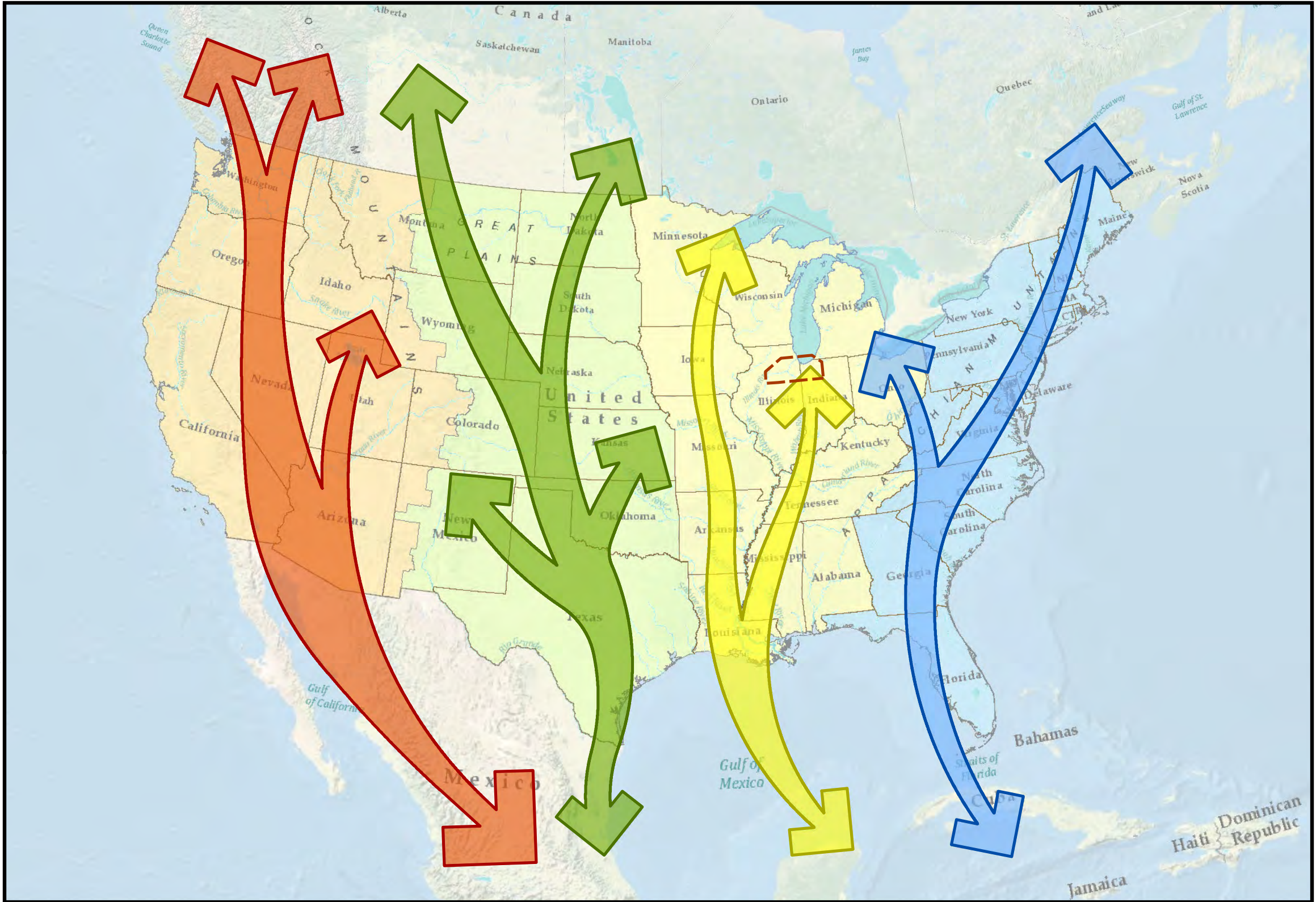
⁸⁵ Coulee Audubon, 2006.

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Legend:

-  Study Area Boundary
-  Atlantic Biological Migration Route
-  Mississippi Biological Migration Route
-  Central Biological Migration Route
-  Pacific Biological Migration Route
-  Atlantic Flyway Administrative Boundary
-  Mississippi Flyway Administrative Boundary
-  Central Flyway Administrative Boundary
-  Pacific Flyway Administrative Boundary
-  State Boundary
-  Water Body

Path: H:\GIS\US\AIL\304050_MDW\Figure16_Migratory_Flyways.mxd



Data Source: US Fish & Wildlife Service (Migratory Bird Flyways) February 4, 2013; Environmental Systems Research Institute (ESRI), (Basemap - Terrain) Dynamic
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

Figure 16

Migratory Flyway Routes



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Existing Wildlife Strikes (Birds and Bats) – Nationwide Data

The FAA National Wildlife Strike Database reports 105,947 bird strikes occurred in the US between the years 1990-2010.⁸⁶ According to this report, the following points are noted:

- Thirty-seven (37) percent of bird strikes occur during takeoff and climb, and 61 percent during the landing decent, approach, and roll.
- Ninety-two (92) percent of commercial aircraft strikes occur at or below 3,500 ft. AGL, and less than 8 percent occur above 3,500 ft. AGL. The FAA reports that approximately 72 percent of bird strikes nationwide occurred when commercial aircraft were at altitudes of less than 500 ft. AGL. The study suggests that the incidence of bird strikes declined by 33 percent for every 1,000 ft. increase in altitude, from 501 to 18,500 ft.
- In addition, 480 strikes with bats were reported from 1990-2010, 359 for which the phase of flight was not reported, and 116 during approach, landing roll, climb, decent, and takeoff run. Only five (5) occurred en route.
- Nationwide, waterfowl, passerines, and gulls/terns are struck by aircraft more often than other species at altitudes greater than 3,500 ft.

Table 13 summarizes nationwide bird strike data by bird group for reported strikes above 3,500 ft. AGL.

Table 13 FAA Wildlife Strike Database Summary Records for the U.S. (1990-2010)

Species Group	Number of Birds/Bats Nationwide Struck at a Height >3,500 ft. ^{1,2}	Percent Birds/Bats Struck at Height >3,500 ft.
Passerines/Songbirds/Perching Birds	157	2.97%
Gulls/Terns	69	1.30%
Pigeons/Doves	5	0.09%
Waterfowl	281	5.31%
Raptors/Hawks/Eagles/Kites	31	0.59%
Shorebirds	17	0.32%
Herons/Egret/Bitterns/Stork	6	0.11%
Vultures	29	0.55%
Owls	1	0.02%
Swifts/Nighthawks	4	0.08%
Pelicans	1	0.02%
Cormorants	1	0.02%
Rails/Coots	0	0.00%
Loons/Grebes	1	0.02%
Bats	7	0.13%
Miscellaneous birds	1	0.02%
Unknown birds	4,678	88.45%
TOTAL	5,289	100%
Sources: FAA, National Wildlife Strike Database, 2012 FAA, National Wildlife Strike Database, Serial Report #17, Feb 2012, Table 1, "Civil Strikes to Civil Aircraft in the US 1990-2010."		

As shown in Table 14, the FAA report contains bat and bird strike data for the states of Illinois, Indiana, and Michigan, which are part of the study area. During the 1990-2010 timeframe,

⁸⁶ FAA, *National Wildlife Strike Database*, "Serial Report #17."

4,787 birds and nine (9) bat strikes were reported in Illinois; 1,390 birds and two (2) bats strikes were reported in Indiana; and 2,529 bird and 13 bat strikes were reported in Michigan. Altitudes for these strikes were not noted. Twenty-four (24) known bat strikes were reported within the three study area states during this period.

Table 14 FAA Wildlife Strike Database Records for Study Area by State (1990-2010)

State	Number of Bird Strikes	Number of Bat Strikes
Indiana	1390	2
Illinois	4787	9
Michigan	2529	13
TOTAL	8706	24
Sources: FAA, National Wildlife Strike Database, 2012 FAA, National Wildlife Strike Database, Serial Report #17, Feb 2012, Table 1, "Civil Strikes to Civil Aircraft in the US 1990-2010."		

Existing Wildlife Strikes (Birds and Bats) – Midway Airport Data

At MDW, raptors (hawks, falcons, and kestrels), pigeons/doves, and gulls/terns are struck more often than any other bird groups according to FAA data collected from 1990-2010. Based on these data sets:

- Eight hundred ninety-two (892) total bird strikes were reported during 1990-2010. Of this number, 554 were known bird species and 338 were unknown species.
- Of the 892 total bird species, 491 strikes provided height data. Of the 491 bird strikes with height data available, 70 (14%) occurred at or above 3,500 ft. AGL.
- The highest number of strikes was from raptors (274 strikes, or 24%), followed by gulls (152 strikes, or 13%), and doves/pigeons (51 strikes, or 5%).
- Of these three groups (raptors, gulls, and doves/pigeons), 44 raptor strikes, 84 gull strikes and 20 dove/pigeon strikes occurred at or above 3,500 ft. AGL.
- Bat strikes were very low at MDW, with one bat strike reported during the 1990-2010 timeframe, and no bats have been reported struck at or above 3,500 ft. AGL.

A summary of bird and bat strike data is provided in Table 15, which provides data on species groups of birds and bats reported struck by civil/commercial aircraft at MDW between 1990 and 2010.

Table 15 FAA Wildlife Strikes at MDW (1990-2010)

Species Group	Number of Birds/Bats at MDW Struck at a Height >3,500 ft.	Total Number of Birds/Bats Struck at MDW ¹	Percentage of Total Strikes >3,500 ft.
Passerines	0	38	0.0%
Pigeons/Doves	0	51	0.0%
Waterfowl	2 (Canada goose)	8	25.0%
Raptors/Hawks/Eagles/Kites	0	274 ²	0.0%
Shorebirds	1 (Common tern)	167 ³	0.6%
Hérons/Egret/Bitterns/Stork	0	1	0.0%
Owls	0	5	0.0%
Pheasants/Grouse	0	1	0.0%
Nighthawks	0	8	0.0%
Bats	0	1	0.0%
Miscellaneous/unknown birds	67	338	19.8%
TOTAL	70	892	7.8%
Notes: <ul style="list-style-type: none"> • FAA database includes a number of bird species without altitude data (Height data available on 491 of these strikes). • Two hundred forty-one (241) of 274 raptor strikes were American Kestrel. • One hundred fifty-two (152) of 167 were gull species alone. Sources: <ul style="list-style-type: none"> • FAA, National Wildlife Strike Database, 2012 • FAA, National Wildlife Strike Database, Serial Report #17, Feb 2012, Table 1, "Civil Strikes to Civil Aircraft in the US 1990-2010." 			

4.3.9 Environmental Justice

The EPA defines Environmental Justice as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."⁸⁷

Demographic data is used in this EA to assess potential impacts to minority and low-income populations under environmental justice considerations. This section describes the 2010 U.S. Census demographic statistics for Cook County, in which the airport is located.

4.3.9.1 Definition of Impact Category

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, the accompanying Presidential Memorandum, and DOT Order 5610.2(a), *Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, provide guidance for the Federal government, including the FAA, with regard to Environmental Justice compliance. The FAA must provide (1) meaningful public involvement by minority and low-income populations and (2) analysis, including demographic analysis, which identifies and addresses potential impacts on those populations that may be disproportionately high and adverse. The Presidential Memorandum encourages the consideration of environmental justice impacts in EAs, especially to determine whether a disproportionately high and adverse impact may occur. Although such an analysis is not required in an EA, it may be helpful in determining whether there is a potentially significant impact.⁸⁸

⁸⁷ EPA, "Environmental Justice": <http://www.epa.gov/environmentaljustice/>.

⁸⁸ FAA Order 1050.1E, Chg. 1, App. A, sec. 16.2a.

4.3.9.2 Existing Conditions

The FAA used data from the 2010 U.S. Census⁸⁹ and 2006-2010 American Community Survey (ACS 5-year dataset)⁹⁰ to identify minority populations and low-income populations in the study area. DOT Order 5610.2(a) defines “low-income” as “a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines.”⁹¹ The order defines “minority” as one of the following categories:

- Black – a person having origins in any of the black racial groups of Africa
- Hispanic or Latino – a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race
- Asian American – a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
- American Indian and Alaskan Native – a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through Tribal affiliation or community recognition
- Native Hawaiian and Other Pacific Islander – persons having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands

Analysis for this EA was performed at the census block group level,⁹² defining and identifying census blocks for minority and low-income population as follows:

- A *minority population census block group* is a group having a minority population percentage greater than the average minority population percentage in the study area. Based on the 2010 data, the average percentage of minority population residing in the study area was 60.1 percent. Therefore, the FAA identified every census block group with a percentage of minority population greater than 60.1 percent as a census block group of environmental justice concern.

A *low-income population census block group* is a group having a low-income population percentage greater than the average low-income population percentage in the study area. Based on the 2010 Poverty Guidelines identified by the HHS,⁹³ and accounting for the average household size within each census block group, the average poverty threshold in the study area was \$17,572 per household. In order to equate this to the low-income household counts available in \$5,000 intervals through the ACS 5-year dataset, the FAA used a threshold of

⁸⁹ U.S. Census Bureau, “2010 U.S. Census data,” released June 2011: http://www2.census.gov/census_2010/04-Summary_File_1/.

⁹⁰ U.S. Census Bureau, “2006-2010 American Community Survey, November 2011,” http://www2.census.gov/acs2010_5yr/summaryfile/ (accessed August 14, 2012 and August 15, 2012).

⁹¹ U.S. Department of Transportation (DOT), Order 5610.2(a), “Department of Transportation Actions to Address Environmental Justice in Minority and Low-Income Populations,” May 2, 2012.

⁹² A U.S. Census block group is one of several geographical units by which the U.S. Census Bureau organizes data and is the smallest such unit available for this analysis throughout the study area. There are 3,057 individual census block groups in, or intersecting (i.e. extending beyond), the study area. This EJ analysis used all 3,057 individual census block groups and therefore the population totals differ compared to other analyses in this EA.

⁹³ U.S. National Archives and Records Administration, “Delayed Update of the HHS Poverty Guidelines for the Remainder of 2010,” Federal Register 75, no. 148 (August 2010): 45628–45629.
<http://www.gpo.gov/fdsys/pkg/FR-2010-08-03/html/2010-19129.htm>

\$20,000 for identifying low-income census block groups. Based on 2010 data, the average percentage of low-income population residing in the study area was 16.3 percent. Therefore, the FAA identified every census block group with a percentage of low-income population greater than 16.3 percent as a census block group of environmental justice concern.

As a result, the FAA defined census blocks of environmental justice concern as those in which either the concentration of minority population and/or the concentration of low-income population are higher than their respective averages of the study area. Tables 16 through 18 present the demographic data and analysis results of minority and low-income population for the purposes of this environmental justice analysis. The per capita income for Cook County as a whole, and within the study area is comparable to that of the State of Illinois. Both the median household income and median family income within the Cook County portion of the study area are higher than that of the county and the state. Tables 17 and 18 provide data on minority and low-income populations within Cook County, the Cook County portion of the study area, as well as statewide and nationwide statistics for comparison purposes.

Table 16 Population, Income, and Employment in the Study Area and Surrounding Region

Demographic Factor	Cook County within Study Area	Cook County	Illinois
Population			
2010 Population	2,80,7428	5,194,675	12,830,632
Total Households	1,020,179	1,966,356	4,836,972
Population, Percent Change (2000-2010)	-4%	-3%	3%
Income			
Per Capita Income	\$27,734	\$27,839	\$27,325
Median Household Income	\$55,139	\$51,466	\$52,972
Median Family Income	\$66,743	\$61,889	\$65,417
Employment			
In Labor Force	2,431,210	2,726,422	6,683,498
Employment in Civilian Labor Force	2,180,481	2,725,413	6,674,563
Employment in Armed Forces	948	1,009	8,935
Unemployment in Civilian Labor Force	249,362	357,591	763,068
Population Not in Labor Force	1,267,066	1,387,654	3,401,492
Source: U.S. Census Bureau, 2010			

Table 17 Minority and Low-Income Population in the Study Area, Surrounding Region, and U.S. Overall

Demographic Factor	Cook County within Study Area	Cook County	Illinois	United States
Minority Population Statistics, 2010				
Minority Population	1,692,519	2,923,063	4,673,087	50,740,089
Percent of Total Population	56%	56%	36%	36%
Persons Below Poverty Level, 2010				
Percent of Total Population	18.5%	16.7%	13.8%	15.3%
Source: U.S. Census Bureau, 2010				

Table 18 Race and Ethnicity Statistics in the Study Area and Surrounding Region

Demographic Factor	Cook County within Study Area		Cook County		Illinois	
	Number	Percent	Number	Percent	Number	Percent
Total Population	2,807,428.00		5,194,675	100%	12,830,632	100%
One Race	2,745,786.00	97.80%	5,062,905	97.3%	12,540,650	97.6%
White	1215308	43.29%	2,877,212		9,177,877	
Black or African American	1122303	39.98%	1,287,767		1,866,414	
American Indian or Alaska Native	10987	0.39%	21,559		43,963	
Asian	85471	3.04%	322,672		586,934	
Native Hawaiian or Other Pacific Islander	754	0.03%	1,724		4,050	
Some Other Race	310963	11.08%	551,971		861,412	
Two or More Races	61642	2.20%	131,770		289,982	
Hispanic or Latino (All Races)	681663	24.28%	1,244,762	24.1	2,027,578	
Notes: <ul style="list-style-type: none"> Names as they appear in U.S. Census 2010 data For environmental justice purposes, the FAA defined a minority population census block as a census block having a percentage of minority population greater than 60.1 percent (the minority population percentage of the study area). For environmental justice purposes, the FAA defined a low-income population census block as a census block having a percentage of low-income population greater than 16.3 percent (the low-income population percentage of the study area). An environmental justice census block is defined as a census block in which either the concentration of minority population or the concentration of low-income population is higher than their respective percentages of the study area. Source: U.S. Census Bureau, 2010						

Figure 17 depicts the areas of environmental justice concern located within the study area, derived from census block groups. In examining Figure 17, it is important to note that population distribution is not necessarily uniform across a census block group. For that reason, the actual number of minority or low-income persons impacted can be more or less than the total population represented by a single census block group because impacts may vary throughout the census block group.

Chicago Midway

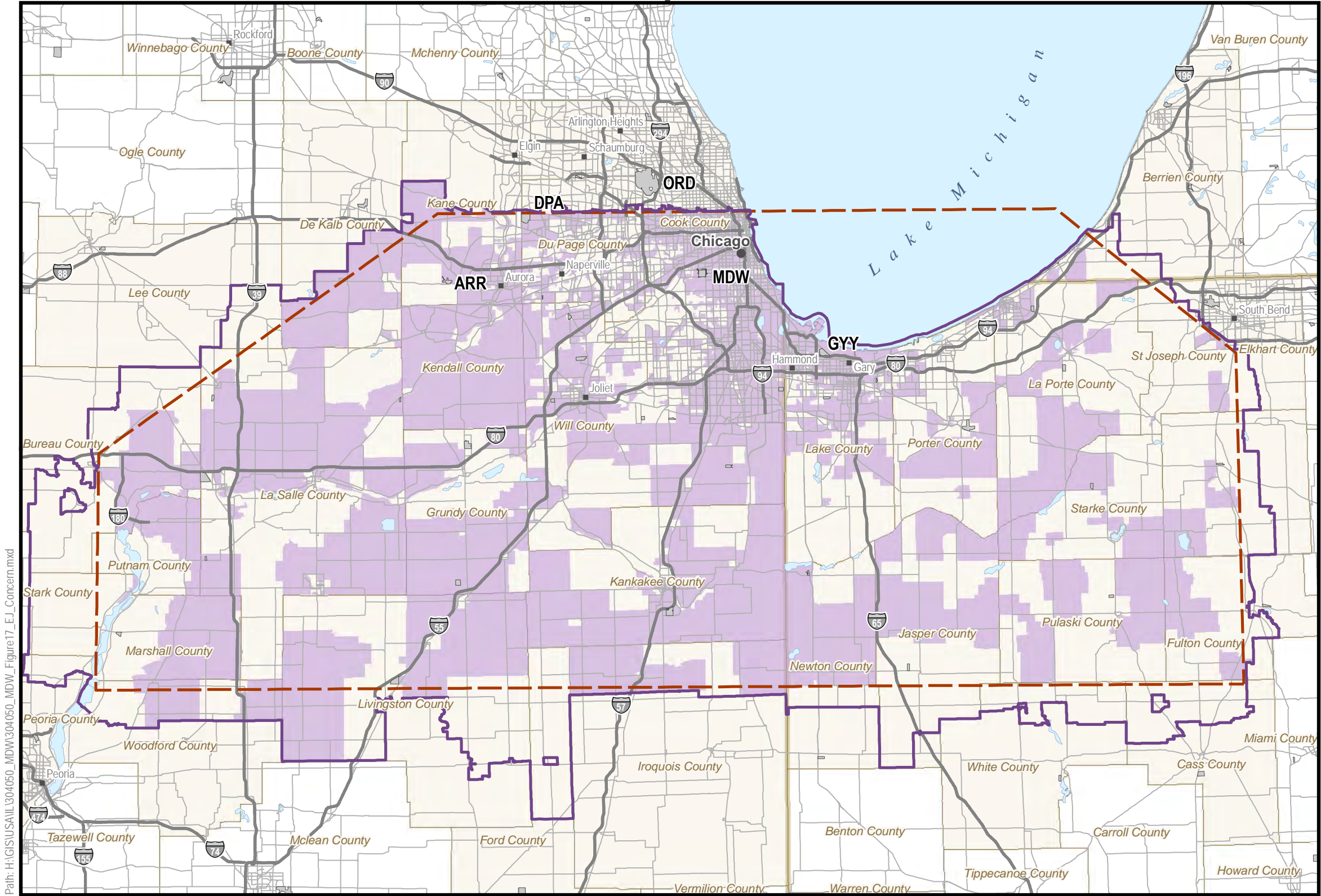
Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports
- Areas of Environmental Justice Concern
- Extent of Environmental Justice Concern Analysis
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

Figure 17
Areas Considered for Environmental Justice –
Distribution of Minority and Low-Income Populations



Path: H:\GIS\US\AIL\304050_MDW\Figure17_EJ_Concern.mxd
Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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4.4 PAST, PRESENT AND REASONABLY FORESEEABLE ACTIONS

In accordance with CEQ regulations, this EA must consider past, present, and reasonably foreseeable future actions in the evaluation of potential cumulative effects of the Proposed Action.⁹⁴ Tables 19 and 20 provide a summary of projects that have been completed, are currently ongoing, or are anticipated to be completed in the foreseeable future that could potentially affect similar resources as those affected by the Proposed Action.

Due to the nature of the Proposed Action (i.e., lack of land disturbing or construction activities), the only projects considered were those with anticipated direct or indirect effects on the following:

- The noise setting, with its corresponding implications to compatible land use, potential DOT Section 4(f) properties, historical and cultural resources, and environmental justice concerns
- Ambient air quality within the study area

Reasonably foreseeable actions were defined as those expected to begin within five years of the Proposed Action.

The Proposed Action is primarily anticipated to affect the noise environment. In particular, this potential effect would primarily occur when the action would involve changes to existing flight paths from the surface up to 10,000 ft. AGL. Such changes to flight procedures would occur near MDW for which changes to instrument flight procedures are periodically proposed.

Table 19 Past, Present and Reasonably Foreseeable Future Actions at MDW for Consideration of Cumulative Impacts

Status of MDW NEPA Approvals	
Project	Date of Approval
2008	
Rehabilitation of Runway 4R/22L	3/6/2008
Purchase of 6301 S. Cicero Avenue and 4735-41 W. 63rd Street (Parcels 133 & 134)	3/6/2008
Concourse A Additions	8/20/2008
Residential and School proofing, EDS - In Line Baggage System & Vehicle Acquisitions	12/15/2008
North Hall Security Expansion	12/30/2008
2011	
Construction of Runway 31C High-Speed Exit to Taxiway A	3/30/2011
Rehabilitation of Runway 13L-31R and 31C Hold pad	6/28/2011
Rehabilitation of Airside Service Road	8/22/2011
Redevelopment of Parcels 133 and 134	8/24/2011
Release of 8.79 acres of land	12/13/2011
Rehabilitation of existing Taxiway Y, ASouth-10(0), TWSouth-10(69), TXD- 10(48), TWK-50(25) and TWG-20185	12/13/2011
2012	
Installation of Centerline and Threshold Lights on Runway 4R/22L	6/5/2012
Demolition of the former Odyssey Aviation Facility (5300-5322 W. 63rd Street)	12/19/2012
2013	
Rehabilitation of Taxiways Y, K and D and South Ramp area (between Runways 4R and 31L)	1/10/2013
Runway 13C/31C Rehabilitation and Lighting Study	NEPA to be completed
2014	
Taxiway P Reconfiguration at Runway 4L/22R	NEPA to be completed
Runway 4L/22R Rehabilitation	NEPA to be completed
Acquisition of Parcel at 55th & Linder for RSA/RPZ Protection	NEPA to be completed
2015	
Runway 13C/21C Rehabilitation and Lighting	NEPA to be completed

⁹⁴ Code of Federal Regulations, Title 40, sec. 1508.7.

Status of MDW NEPA Approvals	
Acquisition of Parcel at 55th & Luna for RSA/RPZ Protection	NEPA to be completed
2016	
Acquisition of Parcel at 64th & Cicero for RSA/RPZ Protection	NEPA to be completed
Proposed Construction and Operation of an Army Aviation Support Facility (AASF) and Readiness Center at the Greater Kankakee Airport in Kankakee, Illinois and Relocation of the Illinois Army National Guard (ILARNG) Operations and Personnel from existing facilities at MDW to a new facility at Greater Kankakee Airport.	NEPA is underway. Draft EA released in January 2013.
FAA maintains the National Airspace System (NAS). Minor changes to procedures, in response to operational issues, or to accommodate requests from air carriers and general aviation may be evaluated under routine maintenance. FAA is not planning on any making any changes to the proposed flight paths below 3,000 ft. AGL.	NEPA occurs as needed in response to projects.

Table 20 Other Past, Present, and Reasonably Foreseeable Future Actions for Consideration of Cumulative Impacts

Project	Current Status
Projects at other Airports Modeled for Noise Exposure in this EA	
Past, present and future projects at other airports in the Study area are comprised of a wide variety of repair, rehabilitation, and expansion projects related to airside (i.e., runways) and landside (i.e., passenger terminals) facilities and infrastructure. Major airport development projects in the study area include the O'Hare Modernization Program and the proposed creation of the South Suburban commercial service airport.	NEPA occurs as needed in response to projects.
Other Regional Airport Projects	
Past, present and future projects at other airports in the Study area are comprised of a wide variety of repair, rehabilitation, and expansion projects related to airside (i.e., runways) and landside (i.e., passenger terminals) facilities and infrastructure. Major airport development projects in the study area include the O'Hare Modernization Program and the proposed creation of the South Suburban commercial service airport.	OMP NEPA process was completed in 2006 and the project is being implemented.
Regional Airspace Projects	
FAA maintains the National Airspace System. Minor changes to procedures, in response to operational issues, or to accommodate requests from air carriers and general aviation may be evaluated under routine maintenance. FAA is not planning on any making any changes to the proposed flight paths below 3,000 ft. AGL.	NEPA occurs as needed in response to projects.
The City of Chicago is proceeding with modernization through its O'Hare Modernization Program (OMP), which reconfigures the airfield. The OMP includes a number of airspace changes associated with the reconfigured runway layout. The FAA considered these airspace changes in an EIS, which concluded there would be no significant noise impacts associated with the OMP's proposed high altitude airspace modifications.	The OMP NEPA process was completed in 2005.
Other Regional Projects	
Regional population growth will continue to generate the need for private and public improvement projects, including new housing; roads, highways and bridges; and commercial and industrial development. In addition, numerous projects to replace existing facilities and infrastructure, enhance the capacity of existing facilities and infrastructure, or redevelop urban land will. A regional project currently undergoing NEPA analysis is the Illiana Corridor Study, which is evaluating a possible transportation corridor from I-55 in Illinois to I-65 in Indiana.	The Tier One EIS study was initiated in 2011 and should be completed in 2013. The Tier Two EIS study should be completed in the 2015 to 2016 timeframe.

5 ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential environmental impacts that could result from implementation of the Proposed Action and the No Action Alternative in all relevant environmental impact categories specified in FAA Order 1050.1E. The FAA evaluated both alternatives for conditions in 2013, the first full year aircraft would use the new procedures under the Proposed Action, and in 2018, five years after expected implementation of the Proposed Action.

5.1 ASSESSMENT OF IMPACTS

Neither the Proposed Action nor the No Action Alternative would involve land acquisition, physical disturbance, or construction activities and therefore they would not affect certain environmental impact categories (see Section 4.1). Accordingly, this chapter does not include assessment of those impact categories. Table 21 provides a summary of the environmental impact categories with potential to be affected by the Proposed Action and the findings of the impact assessment. The remainder of this chapter discusses these summary findings in detail, along with consideration of cumulative impacts.

Each subsection of this chapter begins with a brief overview of impacts, followed by a description of the methodology used to determine impacts, and then a more detailed discussion of the potential impacts. However, in summary, there would be significant, but mitigated impacts for because of implementation of the Proposed Action.

Table 21 Summary of Potential Environmental Impacts of Implementing the Proposed Action (2013 and 2018)

Environmental Impact Category	2013	2018
Noise	Proposed Action would result in DNL 1.5 dB increases in areas exposed to aircraft noise at or above DNL 65 dB. Most of the sensitive receptors (i.e., single-family and owner occupied, multi-family dwelling units) are already eligible for the CDA Residential Sound Insulation Program (RSIP). The residences contained in the area impacted with a DNL 1.5 dB increase within the 65 DNL for the year 2018 will have first priority for mitigation. Those properties, which would be newly included in the DNL 65 dB contour, and which would experience an increase in exposure to aircraft noise of DNL 1.5 dB, would be mitigated over time by virtue of their new eligibility for the CDA RSIP.	Same as 2013
Compatible Land Use	Proposed Action would result in slight increases in the acreages of incompatible land uses within the 65 DNL contour. These impacts would be mitigated through the City of Chicago Department of Aviation residential sound insulation program.	Same as 2013
Dept. of Transportation Act, Section 4(f)	Proposed Action would not use any resources protected under Section 4(f). No significant impact.	Same as 2013
Historical, Architectural, Archaeological, and Cultural Resources	Proposed Action would not adversely affect the historical or cultural characteristics of historic resources. No significant impact.	Same as 2013
Air Quality	The Proposed Action would result in a slightly measurable increase in fuel burned compared to the No Action Alternative. However, the Proposed Action is presumed to conform to the State Implementation Plan (SIP). Accordingly, implementation would not cause or contribute to a new violation of the National Ambient Air Quality Standards (NAAQS). Therefore, implementation would not have a significant impact on air quality and a conformity determination is not required.	Same as 2013
Natural Resources and Energy Supply (Aircraft Fuel)	The Proposed Action would not have a measurable effect on local supplies of energy. No significant impact.	Same as 2013
Climate	Although the Proposed Action would result in a slightly measurable increase in fuel burned compared to the No Action Alternative, no significant project-related effects on climate are expected.	Same as 2013
Fish, Wildlife, and Plants	The Proposed Action would not increase the probability of aircraft strikes to migratory birds, nor would it result in an increase in noise that would have the potential to affect the long-term survival of any species adversely. No significant impact.	Same as 2013
Environmental Justice	Proposed Action would not affect low income or minority populations at a	Same as 2013

Environmental Impact Category	2013	2018
	disproportionately higher level than other population segments, nor would it disproportionately affect children. No significant impact.	

5.2 NOISE

This section provides a summary of the INM and NIRS calculations of future noise exposure in 2013 and 2018 resulting from the Proposed Action and the No Action Alternative, as required by FAA Order 1050.1E. The section also identifies the differences in noise exposure between the two alternatives to determine if implementing the Proposed Action would result in significant noise impacts. Appendices E.2 and E.3 provide additional information on this analysis. Section 4.3.1.2 presents a discussion of existing aircraft noise exposure in the study area.

5.2.1 Overview of Impacts

Implementation of the Proposed Action would result in DNL increases of 1.5 dB or more in noise sensitive areas exposed to aircraft noise at or above DNL 65 dB. However, these impacts would be mitigated through the City of Chicago Department of Aviation's ongoing sound insulation program as part of their Part 150 study.

5.2.2 Methodology

As presented in Section 4.3.1.1, the FAA has developed specific guidance and requirements for the assessment of potential aircraft noise impacts on people. This guidance, described in FAA Order 1050.1E, requires analysis of aircraft noise in terms of the DNL metric. Additionally, the order defines the threshold levels above which the FAA considers a change in aircraft noise causes a significant impact on people. The order defines a significant noise impact as a noise sensitive area (e.g., residences, schools, etc.) experiencing an increase in DNL of 1.5 dB or more at or above DNL 65 dB when compared to the No Action Alternative for the same timeframe.⁹⁵

Table 22 summarizes the criteria used to assess the impact of change in noise exposure attributable to the Proposed Action compared with the No Action Alternative. This section reports noise levels on population, as represented by the 149,783 census block centroids defined in the study area. Sections 5.4 and 5.5 discuss potential noise impacts to Section 4(f) resources and historic resources, respectively.

Table 22 Criteria for Determining Impact of Changes in Aircraft Noise

DNL Noise Exposure under Proposed Action	Increase in DNL with Proposed Action	Aircraft Noise Exposure Change Consideration
DNL 65 dB and higher	DNL 1.5 dB or greater ¹	Significant Impact
DNL 60 dB to 65 dB	DNL 3.0 dB or greater ²	Reportable Increase
DNL 45 dB to 60 dB	DNL 5.0 dB or greater ²	Reportable Increase
Sources: 1. FAA, Order 1050.1E, Chg. 1, App. A, sec. 14.3. 2. FAA, Order 1050.1E, Chg. 1, App. A, sec. 14.5e.		

5.2.2.1 MDW Environs

Aircraft noise impacts were assessed using noise exposure contours produced by the Federal Aviation Administration (FAA) Integrated Noise Model (INM) along with change of exposure

⁹⁵ FAA Order 1050.1E, Chg. 1, App. A, sec.14.3.

calculations made at sensitive receptors using grid points. The distribution of the noise pattern on each map calculated by the INM is a function of the number of aircraft operations, the types of aircraft flown, the time of day of the operation, how frequently each runway is used for arrivals and departures, and the routes of flight used to and from the runway. Substantial variations in any one of these factors may, when extended over a long period of time, cause marked changes to the annual noise pattern. Noise analysis conducted for a CDA 2013 Part 150 Study Update, which is ongoing concurrently with the preparation of this EA, was used for this analysis, and was developed using INM version 7.0c.

The noise exposure pattern at MDW is presented in terms of the Average Day-Night Sound Level (DNL). The DNL metric represents the total aircraft noise energy of the airport operations for an annual-average day. With DNL, the loudness of nighttime (10:00 p.m. to 6:59 a.m.) noise events are increased by 10 dB to reflect the greater sensitivity to noise at night. Noise exposure maps display contour lines that connect points of equal DNL exposure at 65 dB, 70 dB, and 75 dB. Change-of-exposure grid calculations compare the noise exposure at a given point for one scenario to another (e.g., aircraft noise at a point from the Proposed Action compared to the No Action).

Appendices E.1 Basics of Noise and E.2, Integrated Noise Model (INM) Technical Report, contain a complete discussion of DNL and the input data that was used for the calculation of the noise exposure contours at MDW.

For the Proposed Action (2018), which corresponds to the CDA Part 150 future conditions (2018) scenario, the operational data were adjusted to reflect the projected fleet and levels of operations developed in the FAA Terminal Area Forecast (TAF).^{96, 97}

Table 23 provides a summary of the current and forecasted future aircraft operational levels at Midway Airport that were used for noise modeling. Future conditions (2018) reflect a growth in air carrier operations to accommodate the anticipated growth in passenger demand.

Table 23 Midway Airport Summary of Modeled Annual Operations

Year	Passenger	GA	Military	Total
2012	197,672	57,828	2,300	257,800
2013	203,459	59,521	2,300	265,280
2018	231,903	64,447	2,300	298,650
% Change (2012-2018)	17%	12%	0%	16%

Source: HMMH analysis (Year 2013) and CDA, "2013 Part 150 Study Update," Appendix D, Table D-1 (Years 2012 and 2018).

5.2.2.2 Study Area beyond MDW Environs

The process used for evaluating potential changes to the noise setting for areas beyond the immediate vicinity of MDW relied of a different model, NIRS, but with similar inputs and assumptions. In accordance with FAA Order 1050.1E, the FAA analyzed community exposure to aircraft noise within the balance of the study area that would be generated by operations from MDW. The FAA based the number of operations on a forecast of aircraft activity for the years

⁹⁶ The Terminal Area Forecast (TAF) system is the official forecast of aviation activity at FAA facilities. For more information, please see <http://aspm.faa.gov/main/taf.asp>.

⁹⁷ As noted in Section 4.3.1.1., the baseline data (NEM-1 2012 Existing Conditions) relied upon a data collection that began in 2011 prior to the availability of 2012 data. This EA also was begun prior to the availability of 2012 data.

2013 and 2018 and modeled them for conditions under both the No Action Alternative and Proposed Action. The level of aircraft operations modeled in NIRS corresponds to those used in INM but differs in some respects due to differences in nature of the models and the areas covered by each. As noted, INM is intended for the immediate vicinity of an airport whereas NIRS is used when the study area extends beyond the immediate vicinity or includes analysis spanning multiple airports. Appendix E.3, *Noise Integrated Routing System (NIRS) Technical Report*, provides detailed technical information regarding the determination of the study area, the modeling process used for NIRS, and the results of the analysis.

In 1990, the FAA issued a noise screening procedure to evaluate whether certain procedural changes above 3,000 ft. AGL might increase DNL levels by 5 dB or more. The procedure served as a response to the FAA's experience that increases in DNL of 5 dB or more, at cumulative levels well below DNL 65 dB, could be disturbing to people and become a source of public concern. In 1992, the Federal Interagency Committee on Noise (FICON) recommended that in instances where there are DNL increases of 1.5 dB or more at noise sensitive locations at or above DNL 65 dB, that DNL increases of 3 dB or more between DNL 60 dB and 65 dB should also be evaluated. DNL increases of 3 dB below DNL 65 dB are not "significant impacts" but are to receive consideration in the environmental documentation. The FAA has adopted FICON's recommendation in FAA Order 1050.1E.⁹⁸ The Order also provides that increases in DNL of 5 dB or greater between DNL 45 dB and 60 dB should be considered for airspace actions.⁹⁹ For clarity, this EA uses the term "reportable increase" in referring to DNL increases of 3 dB or more between DNL 60 and 65 dB and DNL increases of 5 dB or more between DNL 45 and 60 dB.

Following the noise modeling methodology defined by FAA guidance and requirements for compliance with NEPA requirements,¹⁰⁰ the FAA assembled detailed information on IFR aircraft operations for the Analyzed Airports in order to define and bound the study area as well as to develop flight tracks for input into the FAA's noise model, NIRS. The INM modeling assumptions detailed above pertaining to flight operations activity levels (including annual counts, runway use, and fleet mix) formed the foundation of the NIRS modeling assumptions with deviations only for those aspects where the allowable modeling inputs for NIRS differ from those allowed for INM. The information assembled included:

- Average Annual Day (AAD) operations for 2013 and 2018
- Flight tracks (i.e., the route and altitude profile of an aircraft's flight). These tracks are extensions of the tracks developed for INM but extended to the boundaries of the study area.
- Runway use percentages as modeled in the INM.

In each forecast year, the Proposed Action and the No Action Alternative have the same number and type of aircraft operations. Therefore, the noise analysis reflects the change in noise exposure due to the proposed changes in aircraft routings (i.e., flight tracks) by the Proposed Action, as compared to the No Action Alternative.¹⁰¹

⁹⁸ ., FAA Order 1050.1E, Chg.1, App. A, sec. 14.4c.

⁹⁹ Ibid., sec. 14.5e.

¹⁰⁰ Ibid., sec. 14.

¹⁰¹ For detail, see Chapter 3, Appendix D and Appendix E.

Appendix E.3 provides a detailed discussion of the development of the 2013 and 2018 average annual day operations. The FAA based future year operations on the 2012 TAF for the forecast years, modified with additional detail using previously identified arrival and departure times, aircraft types and origins/destinations. The forecasting used for the NIRS modeling corresponds to the forecasting used for INM and described above for the MDW Environs.

The FAA based the No Action modeled flight track extensions to the INM tracks in collaboration with ATC personnel and radar data collected for the existing conditions (i.e., 2012 Base Year) analysis. For the Proposed Action, the FAA developed flight track extensions to the INM tracks for the new and modified procedures that comprise the Proposed Action. Figures 7, 8, and 9 in Chapter 3, *Alternatives*, depict the procedures and flight tracks under the No Action Alternative and the Proposed Action.

The NIRS model computed DNL values for 2013 and 2018 conditions at three sets of data points throughout the study area (outside of the 65 DNL contours), as discussed in Section 4.3.1.2:

1. Population census block centroids
2. Points representing certain specific cultural resources and areas potentially protected under Section 4(f) of the Department of Transportation Act
3. A uniform grid throughout the study area (using a one-half nautical mile [approximately 3,000 ft.] spacing) to document aircraft noise levels at potential noise sensitive locations that were not otherwise identified

Section 5.2.3 discusses potential noise impacts to census block centroids for the Proposed Action and No Action Alternative in 2013 and 2018. Sections 5.4 and 5.5 discuss potential noise impacts to Section 4(f) resources and historic and other cultural resources, respectively.

5.2.3 Potential Impacts

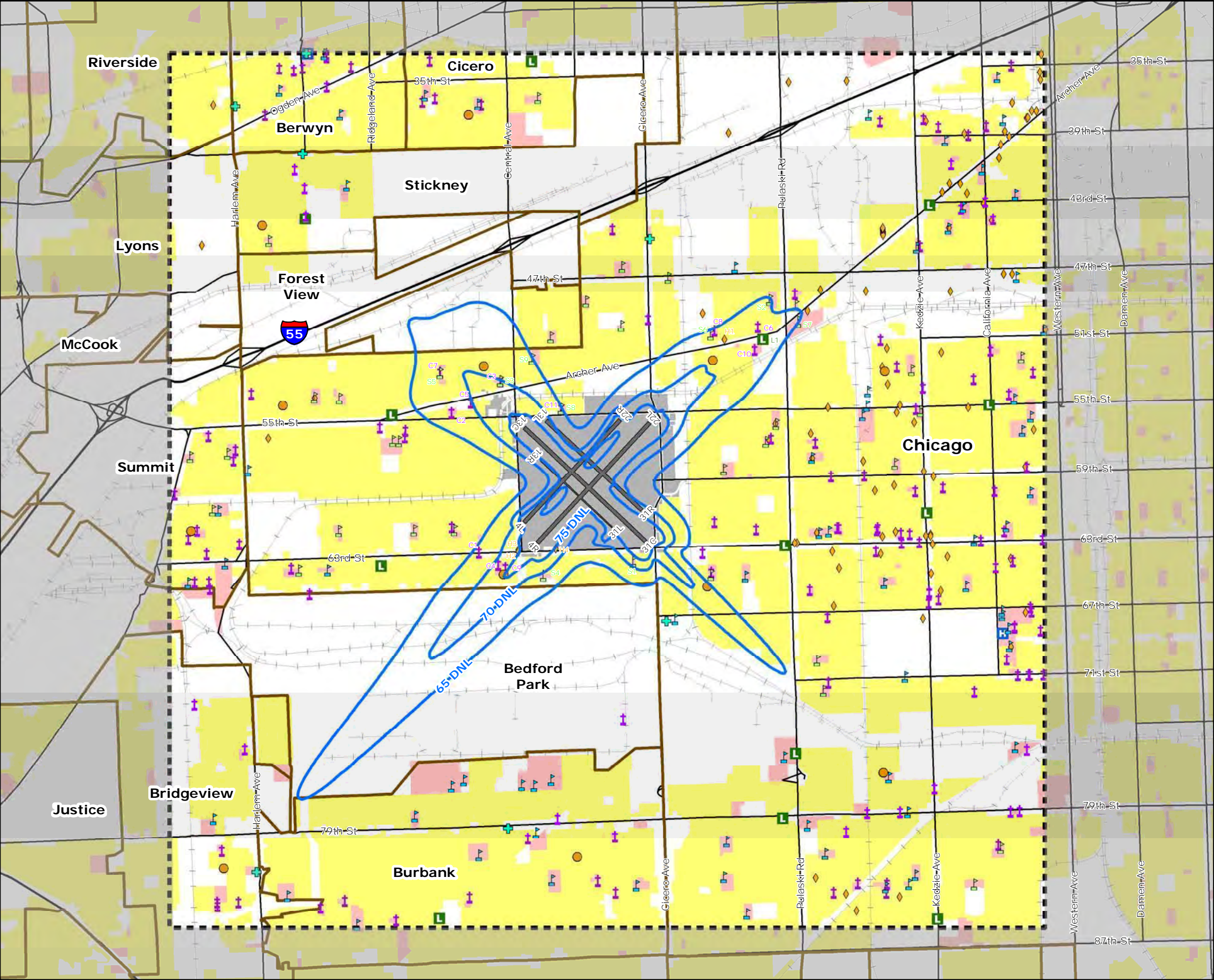
This section provides analysis and results of the impacts anticipated from implementation of the Proposed Action.

5.2.3.1 MDW Environs

The noise analysis presented in this section indicates that the Proposed Action would result in a DNL increase of 1.5 dB in noise sensitive areas exposed to aircraft noise at or above DNL 65 dB. All of these increases would occur northeast of MDW.

Figure 18 shows the anticipated noise setting that would exist in 2018 upon implementation of the Proposed Action. Figure 19 shows anticipated noise setting that would exist in 2018 under the No Action Alternative. Figure 20 provides a comparison of the existing conditions (2012) noise setting against the Proposed Action noise setting in 2018.

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**Midway
International
Airport**

City of Chicago
Rahm Emanuel
Mayor

Department of Aviation
Rosemarie S. Andolino
Commissioner

**FINAL
14 CFR Part 150 Study**

**Future Conditions (2018)
Noise Exposure Map**

Legend

- Noise Contours
- Study Area
- Municipal Boundaries
- Compatible Land Use
- Residential
- Institutional, Medical, Education, Religious
- Existing Airport Property
- Interstates
- Major Roads
- Railroads
- Schools
- Schools - Sound Insulated
- Churches
- Historical Sites
- Nursing Homes
- Libraries
- Hospitals
- Permanent Noise Monitors

Feet
0 2,000 4,000



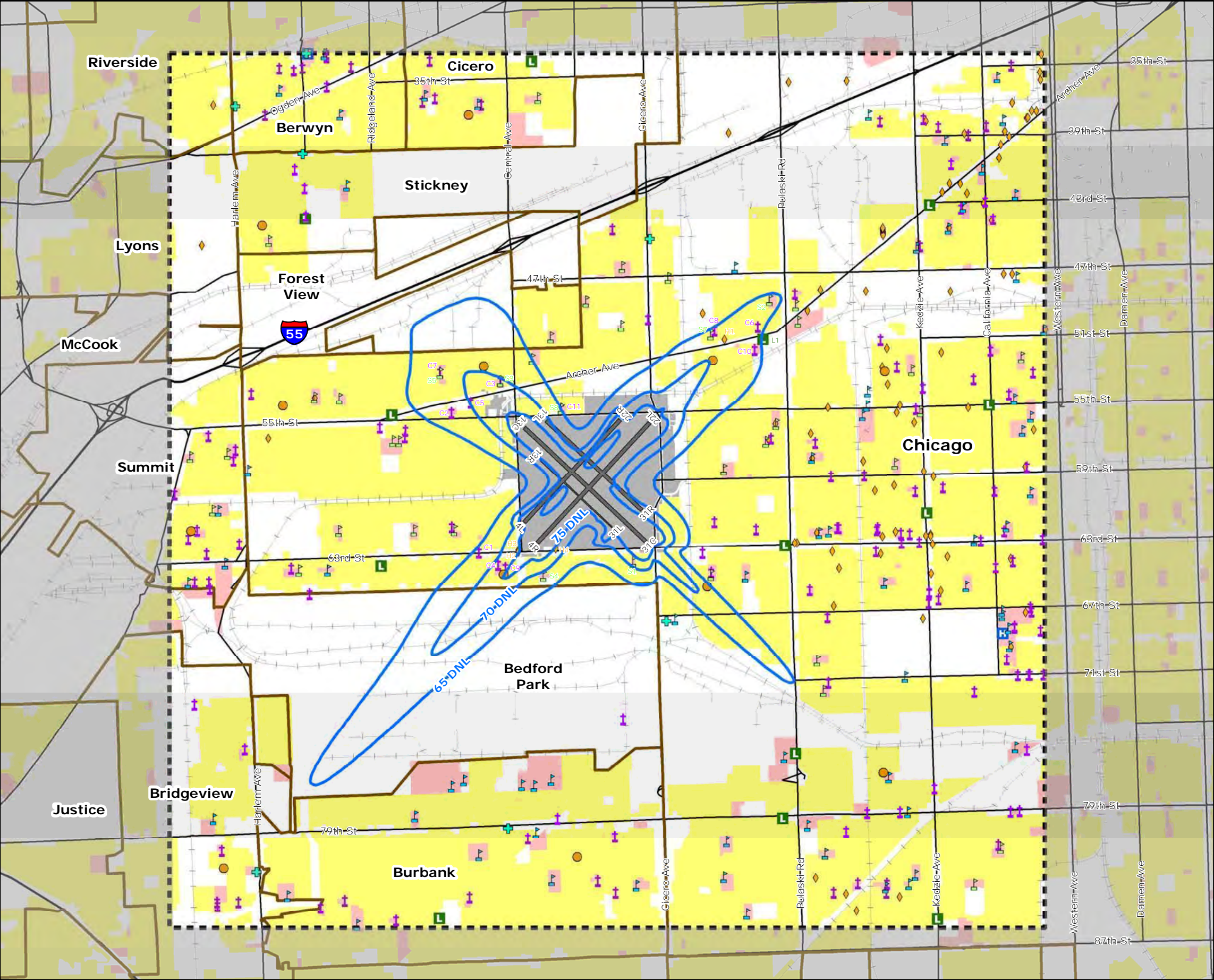
Date: February 5, 2013
File: Future_Conditions_2018.mxd




**Exhibit:
NEM-2**

Source: ESRI Data & Maps, 2012; Land Use: Northeastern Illinois Planning Commission, 2005.

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**Future Conditions (2018)
Alternative A - Noise Exposure Map**

Legend

- Noise Contours
- Study Area
- Municipal Boundaries
- Compatible Land Use
- Residential
- Institutional, Medical, Education, Religious
- Existing Airport Property
- Interstates
- Major Roads
- Railroads
- Schools
- Schools - Sound Insulated
- Churches
- Historical Sites
- Nursing Homes
- Libraries
- Hospitals
- Permanent Noise Monitors

Feet
0 2,000 4,000


N

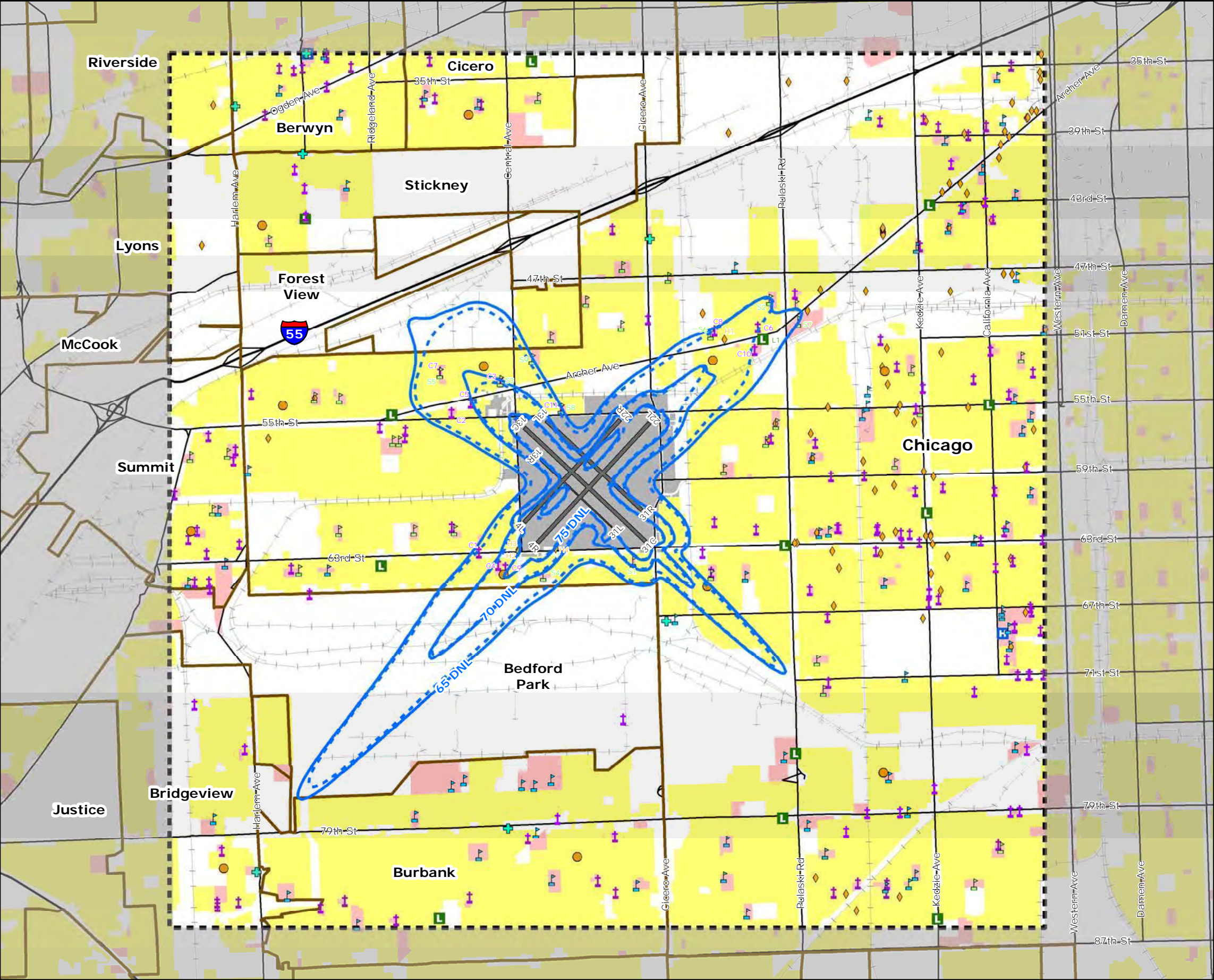


**Exhibit:
D-3**

Date: February 5, 2013
File: No_Action_altA.mxd

Source: ESRI Data & Maps, 2012; Land Use: Northeastern Illinois Planning Commission, 2005.

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Midway International Airport

City of Chicago
Rahm Emanuel
Mayor

Department of Aviation
Rosemarie S. Andolino
Commissioner

FINAL 14 CFR Part 150 Study

Existing Conditions (2012) Baseline Compared to Future Conditions (2018)

Existing Conditions (2012)
Noise Exposure Contour

Future Conditions (2018)
Noise Exposure Contour

Study Area

Municipal Boundaries

Compatible Land Use

Residential

Institutional, Medical,
Education, Religious

Existing Airport Property

Interstates

Major Roads

Railroads

Schools

Schools - Sound Insulated

Churches

Historical Sites

Nursing Homes

Libraries

Hospitals

Permanent Noise Monitors

Feet

0

2,000

4,000

N

Exhibit:
3-3

Date: February 5, 2013
File: Noise_Comparison.mxd



Source: ESRI Data & Maps, 2012; Land Use: Northeastern Illinois Planning Commission, 2005.

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The following tables present the areas exposed to noise levels greater than DNL 65 dB for the Proposed Action and No Action in 2013 (Tables 24 and 25), and the Proposed Action and No Action in 2018 (Tables 26 and 27).

Table 24 Area within Noise Contours for Midway Airport – Proposed Action (2013)

Contour Range	Contour Area (Sq. Mi.)
65-70 DNL	2.4
70-75 DNL	0.7
75+ DNL	0.6
TOTAL – 65+ DNL	3.7
Note: Figures are rounded to the nearest tenth of a square mile. The total area of the 65+ DNL noise exposure contour may not equal sum of individual contour bands due to rounding. Source: HMMH Analysis	

Table 25 Area within Noise Contours for Midway Airport – No Action (2013)

Contour Range	Contour Area (Sq. Mi.)
65-70 DNL	2.4
70-75 DNL	0.7
75+ DNL	0.6
TOTAL – 65+ DNL	3.7
Note: Figures are rounded to the nearest tenth of a square mile. The total area of the 65+ DNL noise exposure contour may not equal sum of individual contour bands due to rounding. Source: HMMH Analysis	

Table 26 Area within Noise Contours for Midway Airport – Proposed Action (2018)

Contour Range	Contour Area (Sq. Mi.)
65-70 DNL	2.6
70-75 DNL	0.8
75+ DNL	0.6
TOTAL – 65+ DNL	4.1
Note: Figures are rounded to the nearest tenth of a square mile. The total area of the 65+ DNL noise exposure contour may not equal sum of individual contour bands due to rounding. Source: CDA, “2013 Part 150 Study Update”	

Table 27 Area within Noise Contours for Midway Airport – No Action (2018)

Contour Range	Contour Area (Sq. Mi.)
65-70 DNL	2.6
70-75 DNL	0.8
75+ DNL	0.6
TOTAL – 65+ DNL	4.1
Note: Figures are rounded to the nearest tenth of a square mile. The total area of the 65+ DNL noise exposure contour may not equal sum of individual contour bands due to rounding. Source: CDA, “2013 Part 150 Study Update”	

The following tables summarize the number of housing units, population, and number of noise sensitive public facilities within the DNL 65 dB noise exposure contour for the Proposed Action and No Action in 2013 (Tables 28 and 29), and the Proposed Action and No Action in 2018 (Tables 30 and 31).

Table 28 Housing, Population, and Noise Sensitive Public Facilities within Noise Contours for Midway Airport – Proposed Action (2013)

	75+ DNL	70-75 DNL	65-70 DNL	65+ DNL
Housing Units				
Sound Insulated – Completed	83	771	4,374	5,228
Sound Insulated – In Progress	0	5	49	54
Previously Dropped/Declined Participation	10	88	930	1,028
Remaining Housing Units Potentially Eligible to Receive Sound Insulation	14	221	834	1,069
<i>Total Housing Units</i>	<i>107</i>	<i>1,085</i>	<i>6,187</i>	<i>7,379</i>
Estimated Population	199	3,384	18,766	22,349
Noise-Sensitive Public Facilities				
Schools (All sound insulated)	0	1	4	5
Churches	0	2	7	9
Libraries	0	0	1	1
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Notes: <ul style="list-style-type: none"> The numbers of housing units were found by utilizing CDA's RSIP GIS database and were verified through aerial photography and field verification. Population numbers were estimated by utilizing the U.S. 2010 Census GIS layers, rounded to the nearest whole number. Housing Units denoted as "Sound Insulated – Completed" are those completed under RSIP Program years prior to 2009 and those denoted as "Sound Insulated – In Progress" are homes in the RSIP 2009, 2010, and 2011 Program Years. Housing Units denoted as "Previously Dropped/Declined Participation" are those that were previously eligible for participation under past RSIP Program Years and either did not respond to invitations or declined to participate. These housing units would be invited to participate in the future RSIP. Source: HMMH and URS Analysis of RSIP GIS database (as of Feb. 7, 2013), prepared by Landrum & Brown. See also CDA, "2013 Part 150 Study Update."				

Table 29 Housing, Population, and Noise Sensitive Public Facilities within Noise Contours for Midway Airport – No Action (2013)

	75+ DNL	70-75 DNL	65-70 DNL	65+ DNL
Housing Units				
Sound Insulated – Completed	81	817	4,453	5,351
Sound Insulated – In Progress	0	5	18	23
Previously Dropped/Declined Participation	10	95	971	1,076
Remaining Housing Units Potentially Eligible to Receive Sound Insulation	14	234	892	1,140
<i>Total Housing Units</i>	<i>105</i>	<i>1,151</i>	<i>6,334</i>	<i>7,590</i>
Estimated Population	199	3,625	19,150	22,974
Noise-Sensitive Public Facilities				
Schools (All sound insulated)	0	1	4	5
Churches	0	2	7	9
Libraries	0	0	1	1
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Notes: <ul style="list-style-type: none"> The numbers of housing units were found by utilizing CDA's RSIP GIS database and were verified through aerial photography and field verification. Population numbers were estimated by utilizing the U.S. 2010 Census GIS layers, rounded to the nearest whole number. Housing Units denoted as "Sound Insulated – Completed" are those completed under RSIP Program years prior to 2009 and those denoted as "Sound Insulated – In Progress" are homes in the RSIP 2009, 2010, and 2011 Program Years. Housing Units denoted as "Previously Dropped/Declined Participation" are those that were previously eligible for participation under past RSIP Program Years and either did not respond to invitations or declined to participate. These housing units would be invited to participate in the future RSIP. Source: HMMH and URS Analysis of RSIP GIS database (as of Feb. 7, 2013), prepared by Landrum & Brown. See also CDA, "2013 Part 150 Study Update."				

A comparison of the Proposed Action (2013) to the No Action Alternative (2013) indicates that the population exposed to aircraft noise at or above DNL 65 dB (i.e., within the contours) decreases by 625 persons. In areas exposed to aircraft noise of DNL 65 dB and higher, the 2013 changes in noise exposure at census block centroids resulting from implementation of the Proposed Action range from a decrease of DNL 0.9 dB to an increase of DNL 1.9 dB. The area where the DNL increases of greater than 1.5 dB occur is northeast of the airport, within the DNL 65 dB contour.

Although a comparison of the population exposed to aircraft noise at or above DNL 65 dB (i.e., within the contours) decreases by 625 persons under the Proposed Action (2013) compared to the No Action Alternative (2013) (22,349 versus 22,974 respectively), the number of persons exposed to a DNL increase of 1.5 dB would be greater than that. In 2013, the numbers of persons exposed to a DNL increase of 1.5 dB would be 820.¹⁰² The differences between these comparisons reflect both the fact that different census blocks would intersect the Proposed Action versus No Action contours and that additions and subtractions of persons below the threshold of significance (i.e., less than DNL 1.5 dB) are also occurring.

In 2013, the area of the DNL 1.5 dB increases in areas exposed to aircraft noise at or above DNL 65 dB contains 43 newly impacted housing units. Overall, 233 housing units are located in this area; of these, 165 have already been sound insulated or are in progress. In addition, the owners of 25 housing units declined participation in the RSIP.

Table 30 Housing, Population, and Noise Sensitive Public Facilities within Noise Contours for Midway Airport – Proposed Action (2018)

	75+ DNL	70-75 DNL	65-70 DNL	65+ DNL
Housing Units				
Sound Insulated – Completed	76	973	4,530	5,579
Sound Insulated – In Progress	0	5	80	85
Previously Dropped/Declined Participation	12	117	1,049	1,178
Remaining Housing Units Potentially Eligible to Receive Sound Insulation	25	363	1,141	1,529
<i>Total Housing Units</i>	<i>113</i>	<i>1,458</i>	<i>6,800</i>	<i>8,371</i>
Estimated Population	464	4,464	19,955	24,883
Noise-Sensitive Public Facilities				
Schools (All sound insulated)	0	2	7	9
Churches	0	3	8	11
Libraries	0	0	1	1
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Notes:				
<ul style="list-style-type: none"> The numbers of housing units were found by utilizing CDA's RSIP GIS database and were verified through aerial photography and field verification. Population numbers were estimated by utilizing the U.S. 2010 Census GIS layers, rounded to the nearest whole number. Housing Units denoted as "Sound Insulated – Completed" are those completed under RSIP Program years prior to 2011 and those denoted as "Sound Insulated – In Progress" are homes in the RSIP 2011 Program Year. Housing Units denoted as "Previously Dropped/Declined Participation" are those that were previously eligible for participation under past RSIP Program Years and either did not respond to invitations or declined to participate. These housing units would be invited to participate in future RSIP. 				
Source: HMMH and URS Analysis of RSIP GIS database (as of Feb. 7, 2013), prepared by Landrum & Brown. See also CDA, "2013 Part 150 Study Update."				

¹⁰² Harris Miller Miller and Hanson, Noise Analysis, 2013.

Table 31 Housing, Population, and Noise Sensitive Public Facilities within Noise Contours for Midway Airport – No Action (2018)

	75+ DNL	70-75 DNL	65-70 DNL	65+ DNL
Housing Units				
Sound Insulated – Completed	90	972	4,472	5,549
Sound Insulated – In Progress	0	5	37	42
Previously Dropped/Declined Participation	11	127	1,024	1,162
Remaining Housing Units Potentially Eligible to Receive Sound Insulation	24	341	1,208	1,573
<i>Total Housing Units</i>	<i>125</i>	<i>1,445</i>	<i>6,756</i>	<i>8,326</i>
Estimated Population	498	4,413	19,801	24,712
Noise-Sensitive Public Facilities				
Schools (All sound insulated)	0	2	5	7
Churches	0	4	7	11
Libraries	0	0	1	1
Hospitals	0	0	0	0
Nursing Homes	0	0	0	0
Notes:				
<ul style="list-style-type: none"> The numbers of housing units were found by utilizing CDA's RSIP GIS database and were verified through aerial photography and field verification. Population numbers were estimated by utilizing the U.S. 2010 Census GIS layers, rounded to the nearest whole number. Housing Units denoted as "Sound Insulated – Completed" are those completed under RSIP Program years prior to 2011 and those denoted as "Sound Insulated – In Progress" are homes in the RSIP 2011 Program Year. Housing Units denoted as "Previously Dropped/Declined Participation" are those that were previously eligible for participation under past RSIP Program Years and either did not respond to invitations or declined to participate. These housing units would be invited to participate in the future RSIP. 				
Source: HMMH and URS Analysis of RSIP GIS database (as of Feb. 7, 2013), prepared by Landrum & Brown. See also CDA, "2013 Part 150 Study Update."				

A comparison of the Proposed Action (2018) to the No Action Alternative (2018) indicates that the population exposed to aircraft noise at or above DNL 65 dB (i.e., within the contours) increases by 171 persons. In areas exposed to aircraft noise of DNL 65 dB and higher, the 2013 changes in noise exposure at census block centroids resulting from implementation of the Proposed Action range from a decrease of DNL 0.7 dB to an increase of DNL 2.1 dB. The area where the DNL increases of greater than 1.5 dB occur is northeast of the airport, within the DNL 65 dB contour.

Although a comparison of the population exposed to aircraft noise at or above DNL 65 dB (i.e., within the contours) increases by 171 persons under the Proposed Action (2018) compared to the No Action Alternative (2018) (24,883 versus 24,712 respectively), the number of persons exposed to a DNL increase of 1.5 dB would be greater than that. In 2018, the numbers of persons exposed to a DNL increase of 1.5 dB would be 892 persons.¹⁰³ The differences between these comparisons reflect both the fact that different census blocks would intersect the Proposed Action versus No Action contours and that additions and subtractions of persons below the threshold of significance (i.e., less than DNL 1.5 dB) are also occurring.

In 2018, the area of the DNL 1.5 dB increases in areas exposed to aircraft noise at or above DNL 65 dB contains 46 newly impacted housing units. Overall, 270 housing units are located in this area; of these, 190 have already been sound insulated or are in progress.

Figure 21 presents population centroids (grid points) where the change in aircraft noise exposure would increase by DNL 1.5 dB or more within the DNL 65+ dB contours for the Proposed Action in 2018 compared to the No Action in 2018.

¹⁰³ HMMH Analysis (2013)

Legend:

- Approximate Airport Boundary
- Airport Runway
- 2018 No Action DNL Contour
- 2018 Proposed Action DNL Contour

2018 Change in Noise DNL Levels

Noise Increases

- 1.5 dB or greater for location with a Proposed Action DNL \geq 65 dB
- New to DNL 65 dB, but no 1.5 dB increase

Noise Decrease

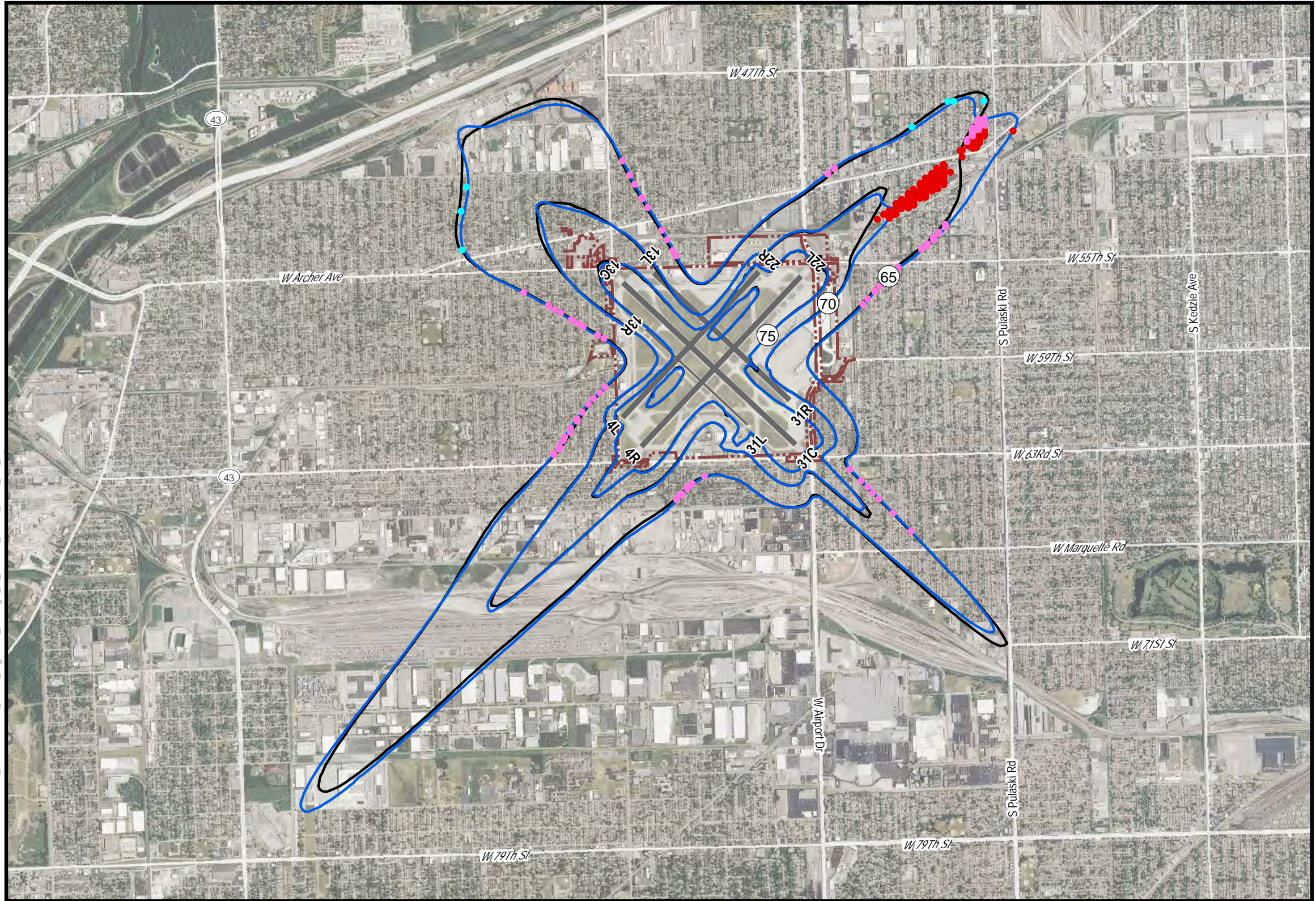
- 1.5 dB for location with a No Action DNL \geq 65 dB
- Removed from DNL 65 dB, but no 1.5 dB decrease

- Highways
- Secondary Highways

Notes:

Points shown represent noise sensitive receptors (E.g., Residences, Schools, Libraries, Places of Worship, Hospitals and Nursing Homes)

Path: H:\GIS\USAIL\304050_MDW\Figure21_Change_In_Aircraft_Noise_2018_NA_PA.mxd



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; L&B, MDW Part 150 (Noise Contours) February 7, 2013; L&B, MDW Part 150 (Noise Sensitive Features) February 7, 2013; ESRI (Roads), March 14, 2012; United States Department of Agriculture (USDA), (Aerial Photography - NAIP), January 23, 2013
Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

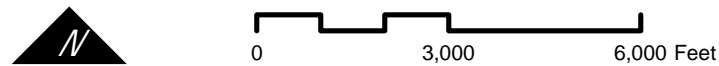


Figure 21

**Change in Aircraft Noise Exposure
(2018 Proposed Action Compared to 2018 No Action) –
Midway Airport Environs**

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Table 30, above, presents a summary of the impacts (housing units, population, and noise sensitive uses) located within the 65 DNL for the Proposed Action (2018) noise exposure contour. There are 8,371 housing units with an estimated population of 24,883 within the 65 DNL. All of these housing units are located within the City of Chicago and Unincorporated Cook County. Of the 8,371 housing units, 5,664 have received, or are in the process of receiving, sound insulation. The 1,178 housing units in the 2018 DNL 65 dB contour that have previously dropped or declined participation in the Residential Sound Insulation Program (RSIP), would be invited to participate in the future RSIP. In addition, approximately 1,529 units would be considered newly eligible for the City of Chicago's RSIP. Therefore, approximately 2,707 units would be considered potentially eligible for the City of Chicago's RSIP. Details on the CDA RSIP can be found in the "2013 Part 150 Study Update" and are incorporated by reference.

Further analysis of the noise sensitive receptors exposed to a change in exposure of greater than DNL 1.5 dB indicates that most of these properties (i.e., the single-family and multi-family dwelling units) have already been insulated or are in the process of receiving sound insulation by virtue of their previously having been located within the DNL 65 dB contour. The balance of the properties, which the data indicate are multi-family or storefront apartment dwelling units, would become eligible for insulation by virtue of their inclusion in the DNL 65 dB contour that would result from implementation of the Proposed Action. The availability of mitigation in the form of sound insulation would reduce noise impacts to less than significant levels.

5.2.3.2 Study Area beyond MDW Environs

The noise analysis presented above focused on areas lying within the DNL 65 dB noise exposure contour. This section focuses on the remainder of the study area. The Proposed Action would not result in reportable DNL increases of 3 dB in noise sensitive areas exposed to aircraft between DNL 60 dB and 65 dB. The analysis, however indicates that there would be reportable DNL increases of 5 dB between DNL 45 dB and 60 dB in 2018. For 2013, while there would be reportable increases, the grid points overlie Lake Michigan and there is no population associated with those.

Figures 22 and 23 illustrate the calculated average daily noise exposure levels for 2013 at census block centroids under the No Action Alternative and the Proposed Action, respectively. Table 31 summarizes the estimated affected population from less than DNL 45 dB to greater than DNL 75 dB in 5 dB increments and the percent change from the No Action Alternative to the Proposed Action.

Figure 24 illustrates the increase or decrease in noise exposure levels at each grid point for year 2013 when comparing the Proposed Action to the No Action Alternative using the FAA Order 1050.1E criteria for significant and reportable noise increases, noted in Table 22 (in Section 5.2.2).

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports
- Runways
- 2013 No Action DNL Levels

DNL < 45.0 dB

DNL 45.0 - 60.0 dB

DNL 60.0 - 65.0 dB

DNL > 65.0 dB
- Major Cities

Detailed Cities
- Highways

Secondary Highways
- Counties within Study Area Boundary

State Boundary

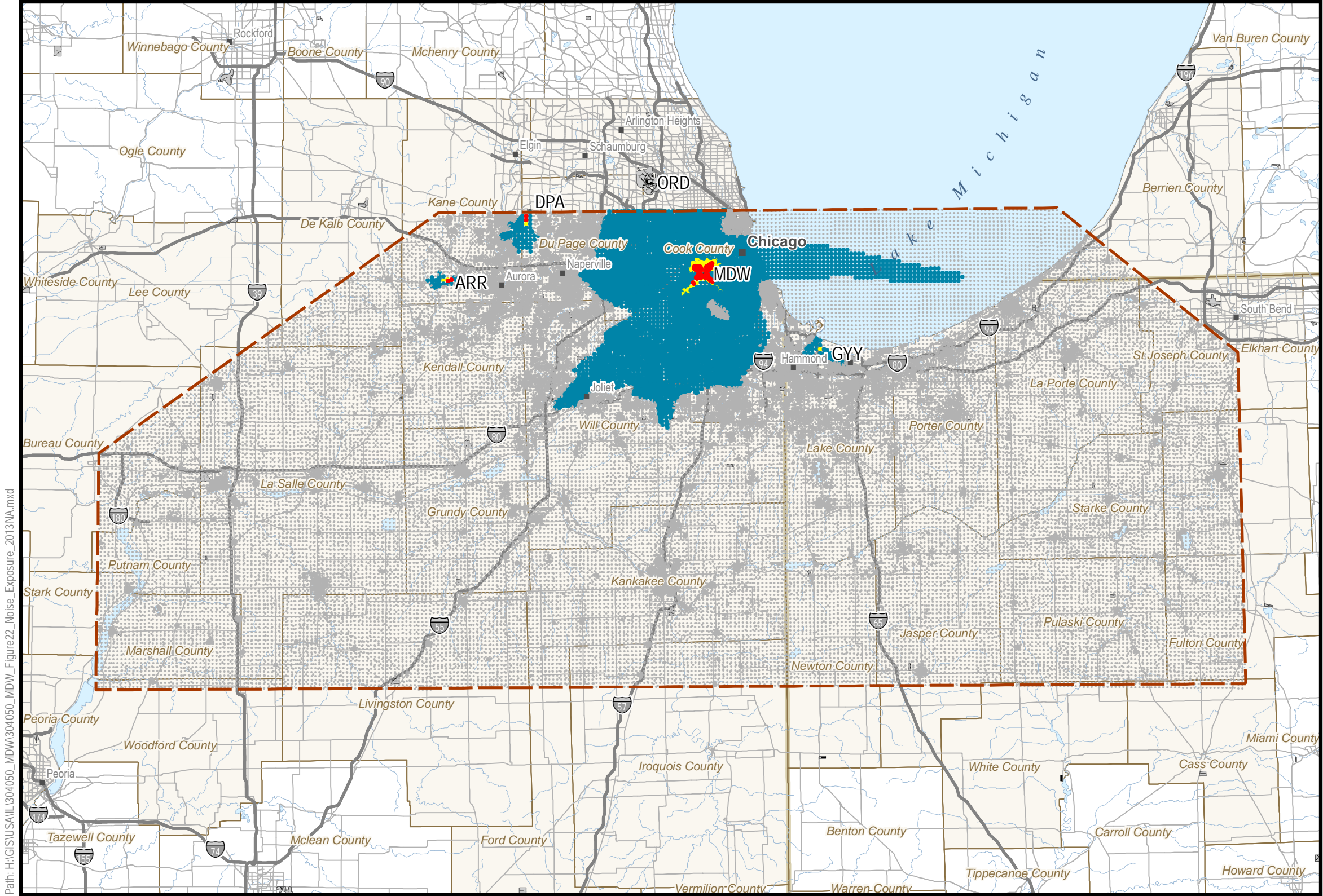
County Boundary

Water Body

Stream / Shore Line

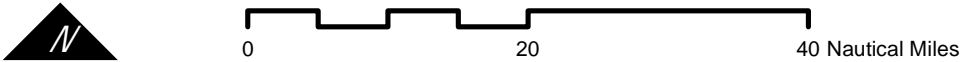
Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GGY - Gary/Chicago International Airport

Figure 22
Population Exposed to Aircraft Noise
No Action (2013)



Path: H:\GIS\USANIL\304050_MDW\Figure22_Noise_Exposure_2013\NA.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

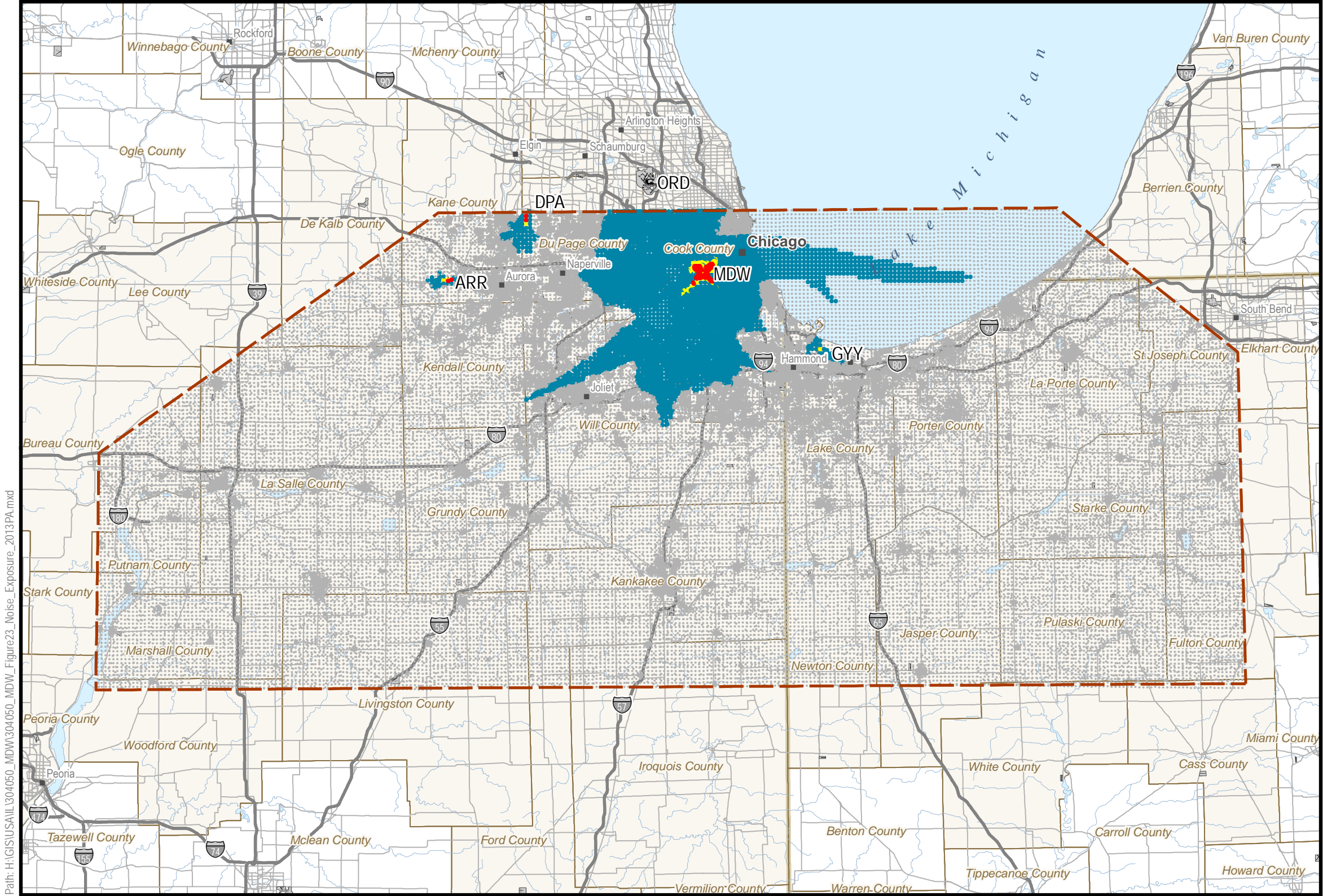
Legend:

- Study Area Boundary
- Airports
- Runways
- DNL < 45.0 dB
- DNL 45.0 - 60.0 dB
- DNL 60.0 - 65.0 dB
- DNL > 65.0 dB
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- Water Body
- County Boundary
- Stream / Shore Line

2013 Proposed Action DNL Levels

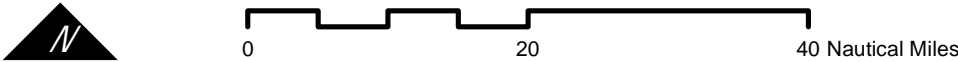
Notes:
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

Figure 23
Population Exposed to Aircraft Noise
Proposed Action (2013)



Path: H:\GIS\USANIL\304050_MDW\Figure23_Noise_Exposure_2013PA.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Table 32 Comparison of Potential Population Exposed to Aircraft Noise (2013)

DNL Range (dB)	No Action Alternative	Proposed Action	Percent Change
Less than 45	3,205,674	3,310,594	3.3%
45 to less than 60	2,726,687	2,626,256	-3.7%
60 to less than 65	61,615	57,524	-6.6%
At or above 65	22,974	22,349	-2.7%
Total	6,016,950	6,016,723	-0.004%
Source: HMMH, 2013			

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports

2013 Change in Noise DNL Levels

Noise Increases

- 1.5 dB or greater for location with a Proposed Action DNL \geq 65 dB
- 3.0 dB or greater for location with a Proposed Action DNL \geq 60 dB and $<$ 65 dB
- 5.0 dB or greater for location with a Proposed Action DNL \geq 45 dB and $<$ 60 dB

Noise Decrease

- 1.5 dB for location with a No Action DNL \geq 65 dB
- 3.0 dB for location with a No Action DNL \geq 60 dB and $<$ 65 dB
- 5.0 dB for location with a No Action DNL \geq 45 dB and $<$ 60 dB

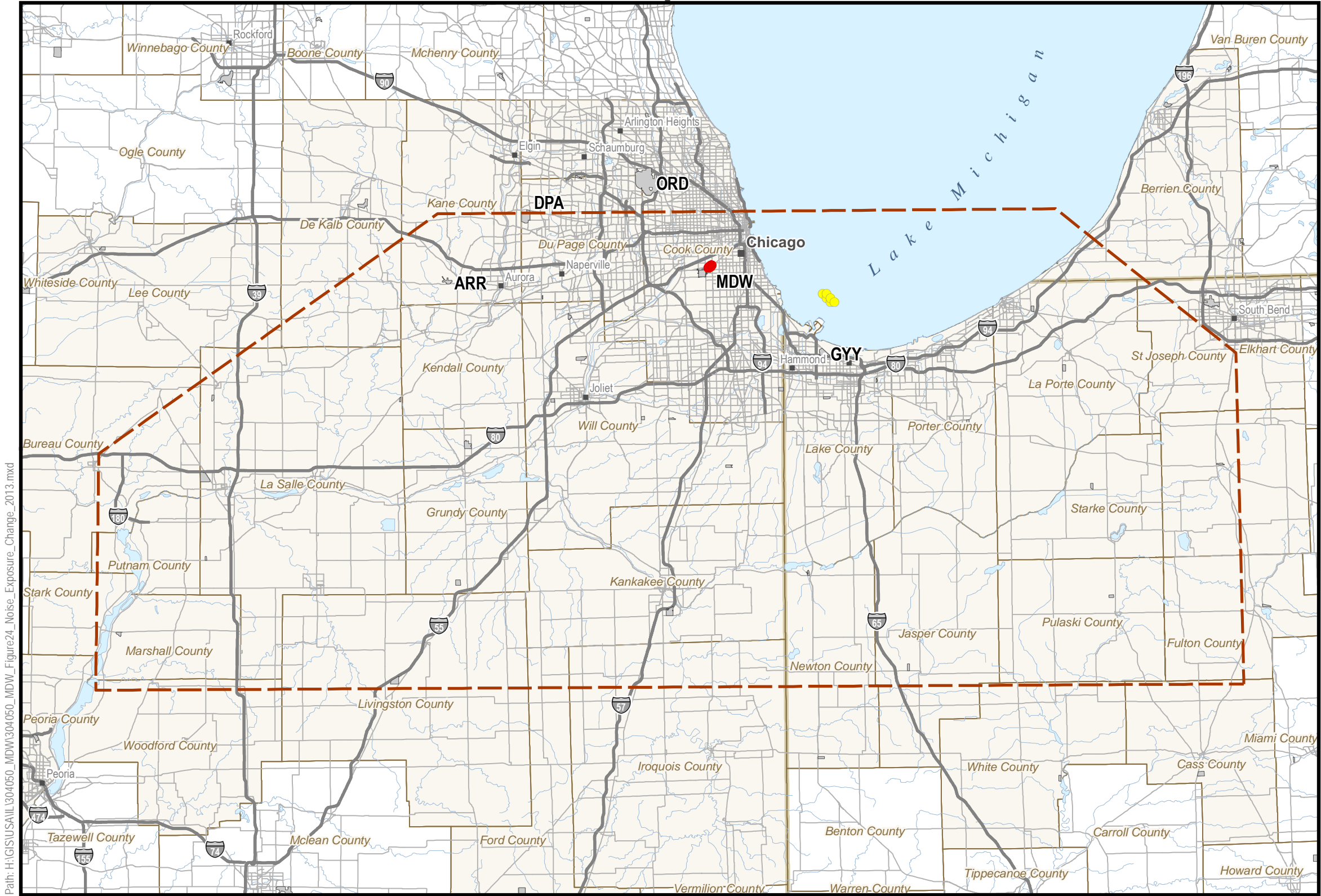
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:

MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

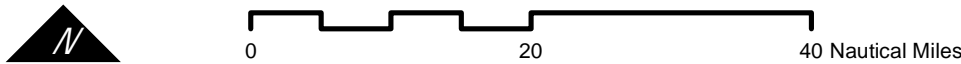
Figure 24

Change of Potential Population Exposed to Aircraft Noise (2013) – Study Area beyond Midway Airport Environs



Path: H:\GIS\USANIL\304050_MDW\Figure24_Noise_Exposure_Change_2013.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Table 33 presents a summary of the population with potential to experience changes in noise exposure for 2013 according to the criteria in FAA Order 1050.1E for significant and reportable noise increases. As indicated in the table, an estimated 820 persons would experience increases in noise exposure as a result of the Proposed Action that would be considered significant (i.e., increase of DNL 1.5 dB or greater in an area exposed to noise of DNL 65 dB or more). No population would experience a reportable noise increase (i.e., increase of DNL 3 dB or greater between DNL 60 dB and 65 dB or increase of DNL 5 dB or greater between DNL 45 dB and 60 dB).¹⁰⁴

Table 33 Change of Estimated Population Exposed to Aircraft Noise (2013)

DNL Noise Exposure Level under Proposed Action	Increase in DNL with Proposed Action	Population Exposed to Threshold Increase
65 dB and higher	DNL 1.5 dB or greater	820
60 dB to 65 dB	DNL 3.0 dB or greater	0
45 dB to 60 dB	DNL 5.0 dB or greater	0
Source: HMMH, 2013		

In areas exposed to aircraft noise of DNL 65 dB and higher, the 2013 changes in noise exposure at census block centroids resulting from implementation of the Proposed Action range from a decrease of DNL 0.9 dB to an increase of DNL 1.9 dB. In areas exposed to aircraft noise from DNL 60 dB to 65 dB, the changes at census block centroids resulting from implementation of the Proposed Action range from a decrease of DNL 1.1 dB to an increase of DNL 1.8 dB. In areas exposed to aircraft noise from DNL 45 dB to 60 dB, changes in noise exposure at census block centroids range from a decrease of DNL 4.3 dB to an increase of DNL 7.1 dB.

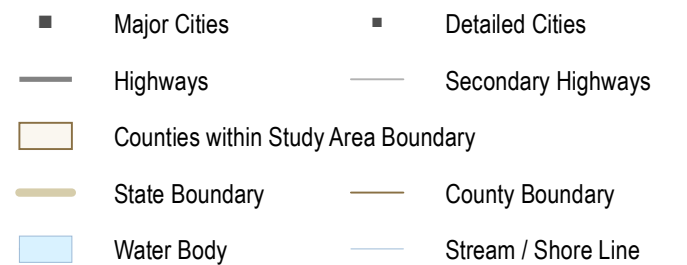
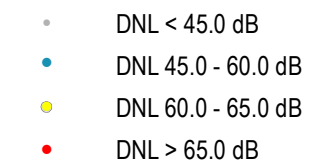
Evaluation of potential 2018 impacts for this EA employed the same methodology and criteria as used in the potential 2013 impact analysis.

Figures 25 and 26 illustrate the calculated average daily noise exposure levels for 2018 at census block centroids under the No Action Alternative and the Proposed Action, respectively. Table 33 summarizes the estimated affected population from less than DNL 45 dB to greater than DNL 75 dB in 5 dB increments and the percent change from the No Action Alternative to the Proposed Action.

Figure 27 illustrates the increase or decrease in noise exposure levels at each grid point for year 2018 when comparing the Proposed Action to the No Action Alternative using the FAA Order 1050.1E criteria for significant and reportable noise increases, noted in Table 22 (in Section 5.2.2). Additionally, it illustrates areas where noise levels would increase by less than DNL 1.5 dB but move above or below DNL 65 dB.

¹⁰⁴ Six (6) locations would experience an increase of DNL 5.0 dB or greater between DNL 45 dB and 60 dB in the 2013 Proposed Action. However, these points are not associated with any population because they lie over Lake Michigan.

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Notes:

MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYY - Gary/Chicago International Airport

Figure 25

Population Exposed to Aircraft Noise
No Action (2018)

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports
- Runways

2018 Proposed Action DNL Levels

- DNL < 45.0 dB
- DNL 45.0 - 60.0 dB
- DNL 60.0 - 65.0 dB
- DNL > 65.0 dB

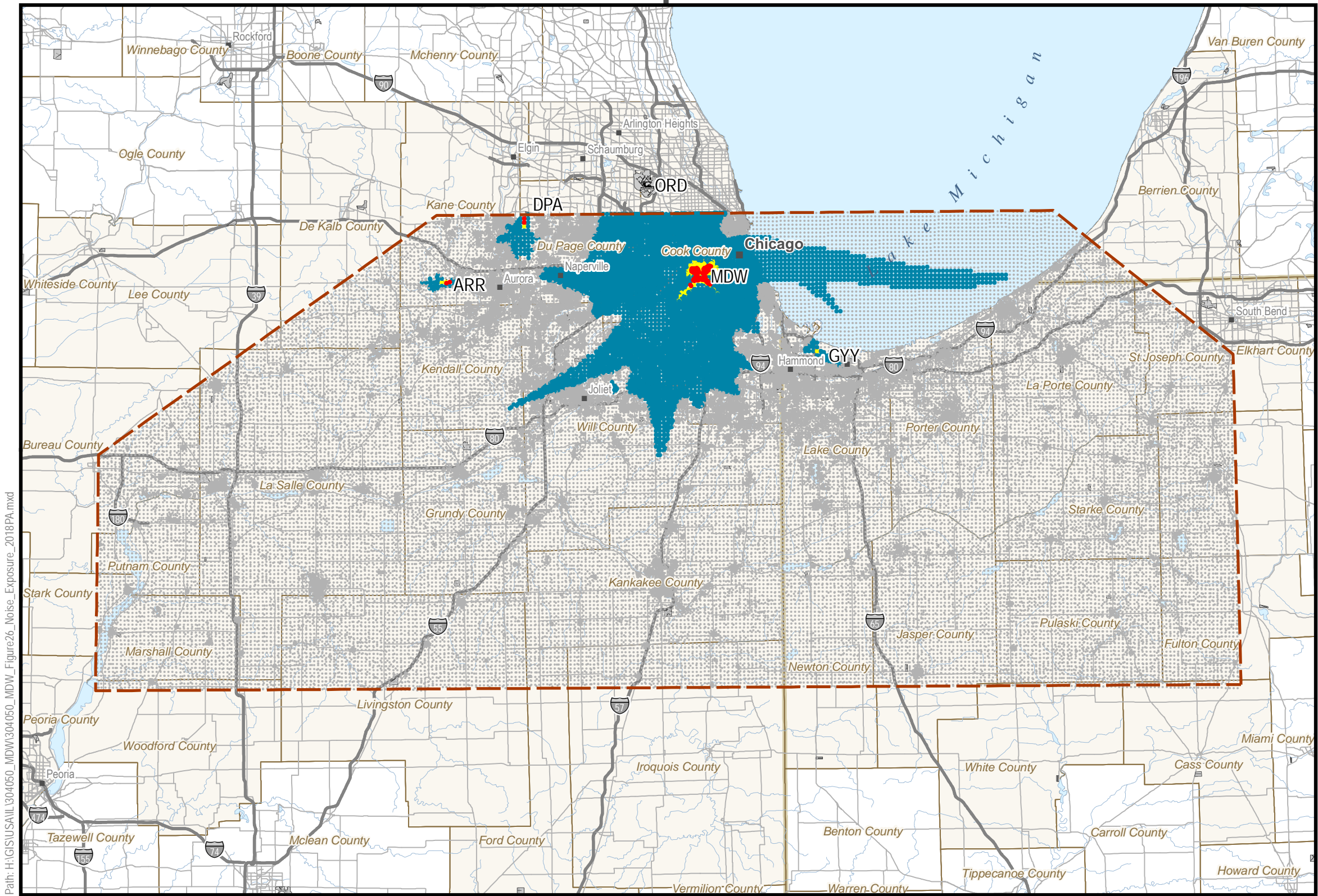
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:

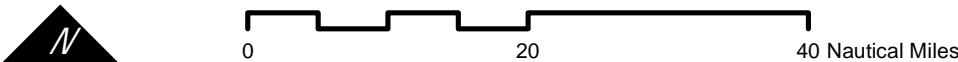
MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GGY - Gary/Chicago International Airport

Figure 26

Population Exposed to Aircraft Noise
Proposed Action (2018)



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Table 34 Comparison of Estimated Population Exposed to Aircraft Noise (2018)

DNL Range (dB)	No Action Alternative	Proposed Action	Percent Change
Less than 45	3,007,181	3,118,851	3.7%
45 to less than 60	2,912,573	2,802,173	-3.7%
60 to less than 65	72,239	70,684	2.2%
At or above 65	24,712	24,883	0.7%
Total	6,016,705	6,016,591	0.0%
Source: HMMH, 2013 (for DNL less than 65 dB data); CDA, 2013 (for the "At or above 65" data)			

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Study Area Boundary
- Airports

2018 Change in Noise DNL Levels

Noise Increases

- 1.5 dB or greater for location with a Proposed Action DNL \geq 65 dB
- 3.0 dB or greater for location with a Proposed Action DNL \geq 60 dB and $<$ 65 dB
- 5.0 dB or greater for location with a Proposed Action DNL \geq 45 dB and $<$ 60 dB

Noise Decrease

- 1.5 dB for location with a No Action DNL \geq 65 dB
- 3.0 dB for location with a No Action DNL \geq 60 dB and $<$ 65 dB
- 5.0 dB for location with a No Action DNL \geq 45 dB and $<$ 60 dB

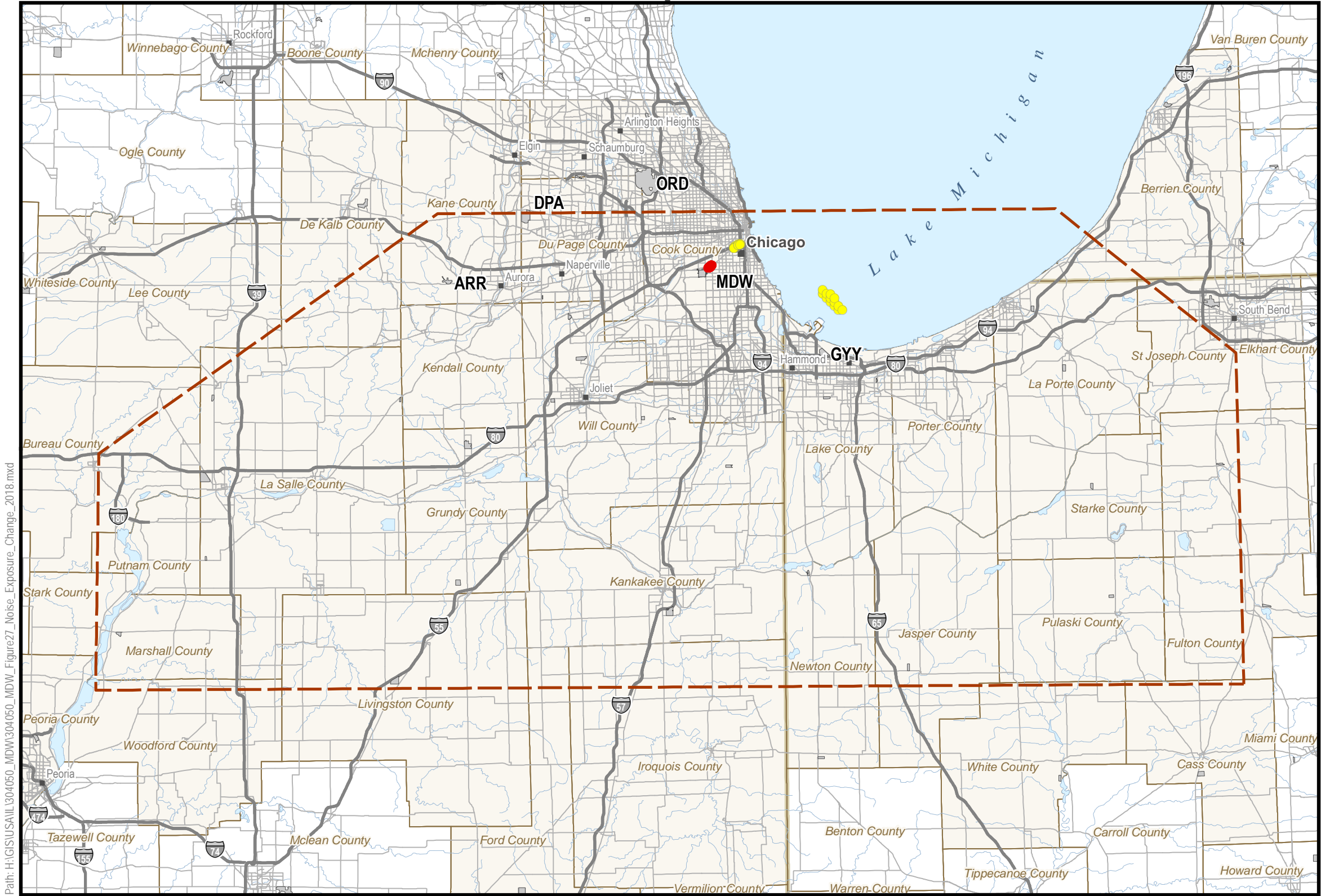
- Major Cities
- Detailed Cities
- Highways
- Secondary Highways
- Counties within Study Area Boundary
- State Boundary
- County Boundary
- Water Body
- Stream / Shore Line

Notes:

MDW - Chicago Midway International Airport
ORD - Chicago O'Hare International Airport
ARR - Aurora Municipal Airport
DPA - Dupage Airport
GYG - Gary/Chicago International Airport

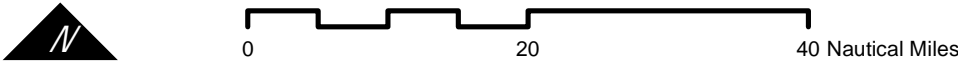
Figure 27

Change of Potential Population Exposed to Aircraft Noise (2018) – Study Area beyond Midway Airport Environs



Path: H:\GIS\USANIL\304050_MDW\Figure27_Noise_Exposure_Change_2018.mxd

Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; ESRI (State Boundaries/County Boundaries), February 8, 2012; ESRI (Cities), February 8, 2012; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013



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Table 35 presents a summary of the population with potential to experience changes in noise exposure for 2018 according to the criteria in FAA Order 1050.1E for significant and reportable noise increases. As indicated in the table, an estimated 892 persons would experience increases in noise exposure as a result of the Proposed Action that would be considered significant (i.e., increase in DNL of 1.5 dB or greater in an area exposed to noise of DNL 65 dB or more). An additional 3,944 persons would experience a reportable noise (i.e., increase of DNL 3 dB or greater between DNL 60 dB and 65 dB or increase of DNL 5 dB or greater between DNL 45 dB and 60 dB) because of the Proposed Action.

Table 35 Change of Estimated Population Exposed to Aircraft Noise (2018)

DNL Noise Exposure Level under Proposed Action	Increase in DNL with Proposed Action	Population Exposed to Threshold Increase
DNL 65 dB and higher	DNL 1.5 dB or greater	892
DNL 60 dB to 65 dB	DNL 3.0 dB or greater	0
DNL 45 dB to 60 dB	DNL 5.0 dB or greater	3,944
Source: HMMH, 2013		

As noted previously, in areas exposed to aircraft noise of DNL 65 dB and higher, the 2018 changes in noise exposure at census block centroids resulting from implementation of the Proposed Action range from a decrease of DNL 0.7 dB to an increase in DNL 2.1 dB. In areas exposed to aircraft noise from DNL 60 dB to 65 dB, the changes at census block centroids resulting from implementation of the Proposed Action range from a decrease of DNL 1.1 dB to an increase of DNL 2.0 dB. In areas exposed to aircraft noise from DNL 45 dB to 60 dB, changes in noise exposure at census block centroids range from a decrease of DNL 4.3 dB to an increase of DNL 8.1 dB.

5.3 COMPATIBLE LAND USE

This section presents a summary of the potential impacts to compatible land use under the Proposed Action, as compared to the No Action Alternative.

5.3.1 Overview of Impacts

The Proposed Action would not involve land acquisition, construction, or other ground disturbance activities, and therefore would not directly affect land use within the study area. In 2013, 7,379 housing units would be exposed to noise of DNL 65 or higher, which is a reduction of 211 housing units when compared to the No Action Alternative. The number of people exposed to noise levels of DNL 65 or greater in 2013 would decrease by approximately 9.5 percent in 2013 under the Proposed Action, and there would be a corresponding decrease of 19.8 acres of noise sensitive land use exposed to noise levels above DNL 65 as compared to the No Action Alternative. In 2018, 8,371 housing units would be located within the 65 DNL or higher contour, which represents an increase of 48 housing units when compared to the No Action Alternative. The number of people exposed to noise levels of DNL 65 or greater would increase under the 2018 Proposed Action. That increase would total less than one percent. Noise sensitive residential land use areas exposed to aircraft noise levels above DNL 65 would increase by 4.5 acres to a total of 862.1 acres.

The Proposed Action would result in aircraft noise exposures that exceed the FAA's significance threshold for noise impacts in 2018. Since the significant noise impacts would be confined to areas that are within the DNL 65 dB noise contour they would be included as part of the CDA's

ongoing Part 150 Noise Study. These areas of impacted land use would be evaluated and mitigation measures, proposed under the framework of the Part 150 Noise Study.

5.3.2 Methodology

FAA Order 1050.1E states, “The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport’s noise impacts.... If the noise analysis ... concludes that there is significant impact, a similar conclusion usually may be drawn with respect to compatible land use.”¹⁰⁵ When the noise analysis indicates that a significant noise impact will occur over noise sensitive areas within the DNL 65 dB contour, the analysis should include a discussion of the noise impact on those areas.

As stated previously, neither the Proposed Action nor the No Action Alternative would involve land acquisition, construction, or other ground disturbance activities. Thus, the compatible land use analysis for this EA relies on the changes in aircraft noise exposure between the Proposed Action and the No Action Alternative (see Section 5.2) as the basis for determining compatible land use impacts within the study area.

5.3.3 Potential Impacts

This section provides analysis and results of the impacts anticipated from implementation of the Proposed Action.

5.3.3.1 MDW Environs

Under the No Action Alternative, there would be no air traffic procedural changes at MDW. Therefore, no changes in aircraft noise exposure would occur, and the No Action Alternative would not result compatible land use impacts in study years 2013 or 2018.

Although there would be no impacts to compatible land use resulting from air traffic procedural changes in the study area under the No Action Alternative, the City of Chicago has engaged in a large residential and school sound insulation program (Section 4.3.2). Changes in land use resulting from this program, which began in 1996, must be considered when evaluating potential impacts associated with the Proposed Action. The City of Chicago has proposed the residential and school sound insulation program to continue through the 2013 and 2018 study years evaluated for this EA. Areas within the DNL 65 dB and above noise contour for the No Action Alternative in 2013 would include 7,590 housing units (including approximately 22,974 people) and fifteen non-residential noise sensitive sites (e.g., schools and churches) within the DNL 65 or higher noise exposure contours (see Table 28 in Section 5.2.3.1). Of these housing units, in 2013, approximately 5,351 will have been sound insulated under the CDA Part 150 Noise Compatibility Program (NCP). Areas within the DNL 65 dB contour under the No Action Alternative in 2018 would include 8,323 housing units (including approximately 24,712 people) and 16 non-residential noise sensitive sites (e.g., schools and churches) within the DNL 65 or higher noise exposure contours (see Table 30 in Section 5.2.3.1). Of these units, approximately 5,378 have been sound insulated under the CDA Part 150 NCP.

Mitigation

The FAA will separate the publications of the proposed procedures. Procedures not creating significant noise increases are eligible to be published and implemented subsequent to approval

¹⁰⁵ FAA Order 1050.1E, Chg. 1, App. A, sec. 4.

of this Finding of No Significant Impact / Record of Decision (FONSI/ROD). The FAA Air Traffic Organization (ATO) will not initially implement the approach procedures into Runway 22L [RNAV (RNP) Runway 22L and RNAV (GPS) Runway 22L]. Implementation of the Runway 22L approach procedures causes the significant impacts described previously and, therefore, these procedures will not be implemented until a the FAA issues a grant to the CDA to sufficiently mitigate the increased noise impact by insulating the DNL 1.5 dB increases within the DNL 65 dB contour, through the CDA's RSIP program. However, if these structures are mitigated independently of the AIP grant process, FAA will implement the procedures. (These procedures will be published to protect airspace for their potential future use. FAA will issue a Notice to Airman [NOTAM] that indicating that the procedures are unavailable and that FAA plans to suspend the procedures in the next chart cycle and republish once the grant is issued or upon mitigation, whichever comes first).

The Part 150 process consists of two major elements: (1) preparation of standardized Noise Exposure Maps (NEMs), and (2) development of a comprehensive Noise Compatibility Program (NCP). A NCP sets forth measures intended to mitigate the impacts of noise exposure on residential areas near an airport (in this case MDW), and to limit, to the extent possible, the introduction of new incompatible land uses into locations exposed to noise. Federal Aviation Regulations (FAR), Part 150 identifies noise level standards. FAR Part 150 also require that potentially affected airport users, local governments, and the public must be consulted during the study, with the process culminating in an opportunity for public hearing on the airport's recommended NCP.

Concurrent with, and in close coordination and anticipation of, preparation of this EA, the CDA has undertaken an update to its Part 150 NEMs and NCP. A previous NCP study for MDW was completed in 1992 and subsequent updates to the NEMs and NCP were issued in 1995, 2000, and 2004. The NEMs and NCP prepared as part of the "2013 Part 150 Study Update" reflect noise exposure conditions that would be expected if the Proposed Action were implemented.

The specific NCP measures recommended include a continuation and expansion of the Residential Sound Insulation Program begun under prior Part 150 studies. Specifically, the NCP recommends adoption of NCP Measure/Alternative LU-1 Residential Sound Insulation Program (Table 36).

Table 36 CDA 2013 Part 150 Study Update – NCP Recommendation LU-1

Title	Residential Sound Insulation Program – LU-1
Description	<p>Since 1996, CDA has managed a voluntary Residential Sound Insulation Program (RSIP) and has sound-insulated over 7,545 homes with the completion of the 2010 Program. Previously, the program only was offered to owner occupied homes within the 65 DNL. To date eligible structures have included single-family, duplex, 2-flat, 3-flat and 4-flat residences that are owner or family-occupied, plus townhomes with up to 4 units.</p> <p>There is a strong interest within the community, and supported by the Chicago Department of Aviation, to expand the RSIP eligibility criteria to include rentals and buildings greater than four units that have previously been excluded as part of the voluntary RSIP in place today.</p>
Benefits	The implementation of this measure would help to reduce the adverse impact of airport related noise on the occupants of the homes surrounding MDW.
Drawbacks	None
Findings and recommendation	This alternative is RECOMMENDED for inclusion in the 2013 NCP.
Source: CDA, "2013 Part 150 Study Update."	

Aircraft noise levels for 2013 projected as a result of the Proposed Action would include 7,379 housing units (including approximately 22,349 people) within the DNL 65 or higher noise exposure contours. The 7,379 housing units represent a reduction of 211 housing units when compared to those within the 65 DNL or higher noise contour associated with the No Action Alternative. Approximately 5,228 of the 7,379 homes identified within the DNL 65 or greater contour have previously been sound insulated under the CDA Part 150 NCP. The number of people exposed to noise levels of DNL 65 or greater would decrease by approximately 2.7 percent in 2013 under the Proposed Action. Refer to Table 27 (in Section 5.2.3.1) for other noise sensitive land uses.

Noise sensitive residential land use areas exposed to aircraft noise levels above DNL 65 total 753.5 acres under the Proposed Action in 2013, as compared to 773.3 acres under the No Action Alternative. This represents a decrease of 19.8 acres of noise sensitive land use exposed to noise levels above DNL 65 dB under the Proposed Action in 2013. Single-family residential would decrease by 18.4 acres and multi-family residential would decrease by 1.4 acres, as shown in Table 37.

Table 37 Comparison of Non-Compatible Land Use – No Action and Proposed Action (2013)

Land Use	65-70 DNL		70-75 DNL		75+ DNL		65+ DNL
	No Action (acres)	Proposed Action (acres)	No Action (acres)	Proposed Action (acres)	No Action (acres)	Proposed Action (acres)	NET CHANGE (acres)
Single Family Residential	583.8	570.9	107.4	101.7	9.5	9.7	-18.4
Multi-Family Residential	61.0	59.5	9.9	10.0	1.6	1.7	-1.4
Total Non-Compatible Land Use	644.8	630.4	117.3	111.8	11.1	11.4	-19.8

Source: HMMH and URS, 2013

Aircraft noise levels projected for the Proposed Project in 2018 would include 8,371 housing units (including approximately 24,883 people) within the 65 DNL of the noise contour for study year 2018. The 8,371 housing units represent an increase of 48 housing units when compared to those within the 65 DNL or higher noise contour for the No Action Alternative. Approximately 5,579 of the 8,371 homes have previously been sound insulated under the CDA Part 150 NCP. The number of people exposed to noise levels of DNL 65 or greater would increase by less than one percent in 2018 under the Proposed Action. Refer to Table 30 (in Section 5.2.3.1) for other noise sensitive land uses.

Noise sensitive residential land use areas exposed to aircraft noise levels above DNL 65 total 862.1 acres under the Proposed Action in 2018, as compared to 857.6 acres under the No Action Alternative. This represents an increase of 4.5 acres of noise sensitive land use exposed to noise levels above DNL 65 under the Proposed Action in 2018. Single-family residential would increase by 4.3 acres and multi-family residential would increase by 0.2 acres, as shown in Table 38. These newly added land uses would be incompatible with noise levels above DNL 65 and would be evaluated and mitigation measures proposed under the framework of the CDA's Part 150 NCP.

Table 38 Comparison of Non-Compatible Land Use – No Action and Proposed Action (2018)

Land Use	65-70 DNL		70-75 DNL		75+ DNL		65+ DNL NET CHANGE (acres)
	No Action (acres)	Proposed Action (acres)	No Action (acres)	Proposed Action (acres)	No Action (acres)	Proposed Action (acres)	
Single Family Residential	629.3	636.4	135.9	134.2	13.1	12.1	4.3
Multi-Family Residential	64.4	64.2	12.8	13.2	2.0	2.0	0.2
Total Non-Compatible Land Use	693.8	700.6	148.7	147.4	15.1	14.1	4.5
Source: URS, 2013							

The Proposed Action would result in aircraft noise exposures that exceed the FAA's significance threshold for noise impacts in 2018 (see Section 5.2.2 and 5.2.3). Since the significant noise impacts would be confined to areas that are within the DNL 65 dB noise contour, they would be included as part of the CDA's ongoing Part 150 Update. These areas of impacted land use would be evaluated and mitigation measures, if warranted, proposed and completed under the framework of the Part 150 Update. Although the Proposed Action would constitute a significant noise impact within several census blocks, and could potentially represent a disproportionately high and adverse effect, the availability of mitigation in the form of sound insulation would reduce noise impacts to less than significant levels.

5.3.3.2 Study Area beyond MDW Environs

Land use classifications within the study area but beyond the MDW Environs include developed (e.g., low, medium, and high intensities, and open space), pastures, cultivated crops, shrub/scrub lands, grasslands, forested lands, wetlands, barren lands, and open water. High-intensity developed land uses occur primarily within and adjacent to the Chicago metropolitan area. There is a transition to low-intensity developed, cultivated, and natural land uses as distance from the City of Chicago increases. Developed land uses also exist farther from the city along the major roadway corridors. Natural land uses are concentrated most heavily around the surface water features (e.g., rivers, lakes) and within area churches.

The Proposed Action, when compared with the No Action Alternative, would not result in changes in aircraft noise exposure that would exceed the FAA's significance threshold (i.e., change of DNL 1.5 dB or greater within the DNL 65 dB Noise Contour) in 2013 and 2018. In addition, no Section 4(f) or Historic Architectural or Cultural Resources would experience a significant change in noise exposure (i.e., increase of DNL 1.5 dB or more at or above DNL 65 dB) or a reportable noise increase (i.e., increase of DNL 3 dB or more between DNL 60 dB and 65 dB or increase of DNL 5 dB or more between DNL 45 dB and 60 dB). Therefore, the Proposed Action would not result in significant compatible land use impacts within the identified study area beyond MDW Environs.

5.4 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F) RESOURCES

This section presents a summary of the analysis of impacts under the Proposed Action and No Action Alternative on resources protected by the DOT Act, Section 4(f). Section 4.3.3 provides information on potential Section 4(f) resources within the study area.

5.4.1 Overview of Impacts

The Proposed Action would not result in direct impacts to any potential Section 4(f) properties. Indirect impacts were evaluated with respect to aircraft noise. No potential Section 4(f)

properties would experience an increase of DNL 1.5 dB or more that would result in a noise exposure level at or above DNL 65 dB. The Proposed Action would not cause any reportable increases in noise exposure to potential Section 4(f) resources below DNL 65 dB. Therefore, the Proposed Action would not cause substantial impairment to any of these resources and, therefore, not constitute a constructive use. No significant impacts are anticipated and a formal Section 4(f) Statement is not required.

5.4.2 Methodology

The FAA evaluates potential effects on Section 4(f) resources in terms of both physical taking and constructive use. A physical taking would occur as a result of land acquisition, construction, or other ground disturbance activities on all or a portion of the potential Section 4(f) property. No such land acquisition, construction, or other ground disturbance activities would occur under either the Proposed Action or the No Action Alternative. Therefore, neither alternative would have the potential to cause a physical taking of any Section 4(f) resources. For this reason, the focus of the evaluation of potential Section 4(f) resources is on indirect (i.e., secondary) effects with a potential to cause a constructive use to occur. A constructive use would occur when impacts would substantially impair the Section 4(f) resources. Substantial impairment occurs only when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. With respect to aircraft noise, for example, to cause a constructive use the noise would have to be at levels high enough to have negative consequences of a substantial nature that would amount to a taking of the Section 4(f) resource for transportation purposes. Generally, constructive use associated with air traffic actions would only occur as the result of noise impacts or visual intrusion.

If recreation lands aided by the Department of Interior's Land and Water Conservation Fund Act, Section 6(f) are "used" by a transportation project, replacement satisfactory to the Secretary of the Interior is required. This analysis considers these resources as a part of the Section 4(f) impact analysis process.

Section 4.3.3 identifies properties within the study area for which conditions indicate that the property may constitute a resource protected by the provisions of DOT Act, Section 4(f). This included publicly owned parks; recreation areas; wildlife and waterfowl refuge of national, state, or local significance; or historic sites of national, state, or local significance. Potential Section 4(f) resources were examined as part of this EA to determine if a constructive use would occur from implementation of the Proposed Action.

Within the study area, but outside of the DNL 65 dB noise exposure contours identified in the CDA's 2012 Part 150 Noise Study, the FAA calculated noise exposure levels using the NIRS noise prediction model at grid points with a uniform spacing of 0.5 NM. This spacing generally places grid points throughout the larger Section 4(f) properties, for which changes to predicted noise exposure were calculated. For small Section 4(f) properties (i.e., small neighborhood parks and historic sites), noise exposure was calculated as a single point located in the center of the property. Within the DNL 65 dB contour, noise exposure levels were obtained from the Part 150 Study, which were calculated using INM. If the analysis showed that a potential Section 4(f) property would experience a significant noise increase (i.e., increase of DNL 1.5 dB or more at or above DNL 65 dB) or a reportable noise increase (i.e., increase of DNL 3 dB or more between DNL 60 dB or a 65 dB or increase of DNL 5 dB or more between DNL 45 dB and 60 dB), the FAA further evaluated the potential Section 4(f) resource to determine whether the

effects from implementation of the Proposed Action would rise to a level of being a constructive use.

5.4.3 Potential Impacts

This section provides analysis and results of the impacts anticipated from implementation of the Proposed Action.

5.4.3.1 MDW Environs

The noise analysis shows that the Proposed Action would not result in a significant noise increase (i.e., increase of DNL 1.5 dB or more at or above DNL 65 dB) at any potential Section 4(f) resource located within, partially within, or immediately adjacent to the existing conditions (2012) DNL 65 dB noise exposure contour. In addition, none of the potential Section 4(f) resources would experience a reportable noise increase (i.e., increase of DNL 5 dB or more between DNL 45 dB and 60 dB, or increase of DNL 3 dB or more between DNL 60 dB and 65 dB). If the Proposed Action were implemented, Section 4(f) resources in the MDW environs would be exposed to noise levels ranging from DNL 59.8 dB at the West Lawn Park, to DNL 74.5 dB at the Chicago Historical Survey site (located at 5600-08 W. 63rd Street¹⁰⁶ at the southwest corner of MDW) in 2018.

The FAA's *Land Use Compatibility Guidelines*, contained in *Code of Federal Regulations*, Title 14, Part 150, were used to determine if the projected noise levels at each Section 4(f) resource would constitute a constructive use. The Land Use Compatibility Guidelines indicate that the noise levels associated with the Proposed Action would be compatible with each Section 4(f) resource's use. Each resource is located within areas subject to existing aircraft noise and the projected changes in noise exposure are not expected to substantially diminish the activities, features, or attributes of the resources that contribute to their significance or enjoyment. The resources features do not include features that rely on a quiet setting (i.e., amphitheater or outdoor music shells) or have a setting where natural quiet is a recognized feature or attributes to the resource's significance. Although sports fields are located at two parks that would experience noise levels of DNL 65 dB or higher (Strohacker Park and Lawler Park), the fields are not considered "outdoor sports arenas and spectator sports" that require special sound reinforcement systems. Noise exposure increase at Lawler Park would be DNL -0.1 dB in 2013 and DNL 0.0 dB in 2018. At Strohacker Park, the projected noise increase would be DNL 0.2 dB in 2013 and DNL 0.3 dB in 2018. Of the three local historic properties located within the DNL 65 dB noise exposure contour, three would experience slight decreases in noise and one property (Illinois National Guard Armory) would experience only a DNL 0.2 dB increase by 2018. Based on the results of the noise analyses, the FAA determined that the Proposed Action would not result in a constructive use of any potential Section 4(f) resources in the MDW environs and a formal Section 4(f) statement is not required.

5.4.3.2 Study Area beyond MDW Environs

The noise analysis conducted for this EA shows that the Proposed Action would not result in a significant noise increase at any potential Section 4(f) resource located beyond the MDW environs. In addition, no potential Section 4(f) resources would experience a reportable noise increase. The noise levels associated with the Proposed Action would not exceed the FAA's

¹⁰⁶ This property is at the northwest corner of 63rd St. and Central Ave. The City of Chicago has purchased the property with the intent to demolish the structure to address an existing obstruction issue, and is preparing NEPA documentation (Environmental Assessment) and Section 106 coordination for the proposed demolition

Land Use Compatibility Guidelines at any of the Section 4(f) resources. Based on the results of the noise analyses, the FAA determined that the Proposed Action would not result in a constructive use of any potential Section 4(f) resources and a formal Section 4(f) statement is not required.

Under the Proposed Action in 2018, Section 4(f) resources in the study area would be exposed to noise levels ranging from DNL 20.2 dB at the Marshall State Fish and Wildlife Area (located in Lacon, Illinois) to DNL 64.5 dB at a Chicago local historic site (4901 S. Archer Avenue). Of the 4,687 grid points associated with potential Section 4(f) resources beyond the MDW environs, 1,391 (29.7 percent) would experience an increase in noise exposure of DNL 1 dB or less and 2,683 (57.2 percent) would experience a decrease in noise exposure in 2018. A portion of the Illinois & Michigan Canal National Heritage Corridor would experience the greatest predicted change in noise exposure in year 2018. Noise exposure levels at a portion of the National Heritage Corridor would increase by DNL 8.7 dB from DNL 29.4 dB to DNL 38.1 dB. This change is below reportable levels.

Table 39 summarizes the analysis of noise impacts for Section 4(f) resources. Appendix F lists the potential Section 4(f) resources that the FAA modeled for noise analysis and provides predicted noise exposure information for each potential Section 4(f) resource for both the No Action Alternative and Proposed Action.

Table 39 Change of Aircraft Noise Exposure at Section 4(f) Resources (2013 and 2018)

Evaluation Criteria	Number of Section 4(f) Resources	
	2013	2018
Significant Noise Increase over Section 4(f) Resources		
DNL increase of 1.5 dB or more at or above DNL 65 dB	None	None
Reportable Noise Increase over Section 4(f) Resources		
Reportable DNL increase of 3 dB or more between DNL 60 dB and 65 dB	None	None
Reportable DNL increase of 5 dB or more between DNL 45 dB and 60 dB	None	None
Source: HMMH and URS, 2013		

As described in FAA Order 1050.1E, a significant impact would occur pursuant to NEPA when a proposed action either involves more than a minimal physical use of a Section 4(f) property or is deemed a constructive use substantially impairing the 4(f) property and mitigation measures would not eliminate or reduce the effects of the use below the threshold of significance. The Proposed Action would not involve the physical use of a Section 4(f) property or have indirect impacts generating a constructive use of a Section 4(f) property. Therefore, the Proposed Action would not exceed the threshold indicating a significant impact and a formal Section 4(f) Statement is not required.

5.5 HISTORICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

This section presents a discussion of impacts on historic resources. Section 4.2.4 of this EA provides information on historic resources located within the study area.

5.5.1 Overview of Impacts

The Proposed Action would not result in direct impacts to any historic resources. Indirect impacts were evaluated with respect to aircraft noise and visual impacts. NRHP historic, architectural, or culturally significant resources would not experience an increase of DNL 1.5 dB

resulting in a noise exposure level of DNL 65 dB or greater, when compared to the No Action Alternative. In addition, the Proposed Action would not generate a reportable increase in noise at any historic resource. No significant impacts are anticipated.

5.5.2 Methodology

Section 106 of the *National Historic Preservation Act (NHPA)* requires the FAA to consider the effects of the agency's undertakings on properties listed, in or eligible for listing in, the National Register of Historic Places (NRHP). In assessing whether or not an undertaking affects a historic property, both direct and indirect effects are considered. Direct impacts are those that would physically remove or alter a historic resource. Indirect (or secondary) impacts include changes in the environment of the historic resource that could substantially interfere with the use or character of the property. For most airspace actions, changes in the noise environment and visual impacts have the highest potential to diminish the integrity of the property's setting.

Federal regulations define the area of potential effect (APE) as the geographic area, or areas, within which an undertaking may cause alterations in the character or use of historic properties directly or indirectly, if any such properties exist. The scale and nature of an undertaking influence the APE and may be different for different kinds of effects caused by the undertaking. For this EA, the FAA defined an area of potential effect (APE) to assess the potential effects of the Proposed Action on historic properties. Because there would be no substantial lighting and visual impacts (see Section 4.1), the FAA does not expect the Proposed Action to result in significant visual effects. Therefore, the FAA defined the APE on potential noise effects. The FAA calculated noise exposure levels at NRHP historic properties within the study area. The FAA then defined the APE for NRHP historic resources as the specific areas encompassing the historic properties within the study area that would be exposed to DNL 45 dB and higher under the Proposed Action (in either 2013 or 2018). The APE, depicted in Figure 15 (in Section 4.3.4.2), contains 209 resources listed in the NRHP.

Section 4.3.4 describes the process used for identifying NHP historic, architectural, and cultural resources within the study area. For each historic property identified, the FAA calculated predicted changes in noise exposure that would result from implementation of the Proposed Action. The methods for predicting changes in noise are the same as discussed in Section 5.4.2 for DOT, Section 4(f) Resources. The impact analysis considered whether such properties would experience a significant noise increase (i.e., increase of DNL 1.5 dB or more at or above DNL 65 dB) or a reportable noise increase (i.e., increase of DNL 3 dB or more between DNL 60 dB and 65 dB or increase of DNL 5 dB or more between DNL 45 dB and 60 dB). If a reportable noise increase were to occur, the FAA would conduct further investigations and consultations to ascertain whether the increase would result in an "adverse effect."¹⁰⁷

Based on the FAA's identification of an APE and the evaluation of indirect impacts on historic resources, the Proposed Action is not anticipated to have an adverse effect under *Code of Federal Regulations*, Title 36, sec. 800.5(a). In accordance with NHPA, Section 106 and implementing regulations at *Code of Federal Regulations*, Title 36, Part 800, the FAA is consulting with the Illinois Historic Preservation Agency, the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology, and the Michigan State Historic

¹⁰⁷ Per CFR, Title 36, sec. 800.5(a), an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Preservation Office. A copy of this Draft EA was provided to each party to provide information on the proposed federal undertaking and potential impacts on historic resources.

5.5.3 Potential Impacts

This section provides analysis and results of the impacts anticipated from implementation of the Proposed Action.

5.5.3.1 MDW Environs

There are three local historic properties located within existing conditions (2012) DNL 65 dB noise exposure contour and included in area of the MDW environs. Noise modeling indicates, under the Proposed Action, these historic resources would be exposed to noise levels ranging from DNL 67.8 dB to DNL 74.5 dB in 2018 (see Table 40 below). Two of the three historic properties would experience a decrease in noise exposure of between DNL 0.1 dB and 0.5 dB if the Proposed Project was implemented. The third historic property would experience an increase in noise exposure of DNL 0.2 dB if the Proposed Action was implemented. All three changes in noise exposure to historic properties in the MDW environs are below the significance level¹⁰⁸. Furthermore, all changes are below reportable levels.¹⁰⁹

Table 40 Historic Properties within DNL 65 dB Noise Exposure Contour

Historic Site	2013 No Action	2013 Proposed Action	Change	2018 No Action	2018 Proposed Action	Change
5046 S. Kolin Ave., Chicago ¹	68.0	67.5	-0.50	68.3	67.8	-0.50
5600-08 W. 63rd St., Chicago ²	74.3	74.3	0.00	74.6	74.5	-0.10
6248-58 S. Central Ave., Chicago ²	74.0	73.9	-0.10	74.3	74.2	-0.10
Illinois National Guard Amory	73.6	73.7	0.10	74.1	74.3	0.20

Notes:

1. Data points analyzed for 5600-08 W. 63rd St. and 6248-58 S. Central Ave. represent the same property.
2. 5046 S. Kolin Ave. is listed as a potential historic site in the Chicago Historic Resources Survey (CHRS), which is a local survey conducted from 1983 to 1995. This structure was listed as possessing some architectural feature or historical association that made it potentially significant in the context of the surrounding community. Full sound insulation of the structure was initiated in March 2007 and substantially complete in March 2008.

Source: NRHP database, 2012; City of Chicago Landmarks database, 2012; City of Chicago Historical Survey Database, 2012.

5.5.3.2 Study Area beyond MDW Environs

The Proposed Action would not include any ground disturbance, construction or land acquisition. The Proposed Action would not physically remove or alter any historic, architectural, archaeological, or cultural resource and; therefore, no direct impacts would occur.

Noise modeling indicated that the Proposed Action would not result in a significant noise increase (i.e., increase of DNL 1.5 dB or more at or above DNL 65 dB) at any historic resource within the APE located beyond the MDW environs. In addition, no historic resources within this portion of the APE would experience a reportable noise increase (i.e., increase of DNL 5 dB or

¹⁰⁸ The property at 5046 S. Kolin Ave. is listed as a potential historic site in the Chicago Historic Resources Survey (CHRS), which is a local survey conducted from 1983 to 1995. This structure was listed as possessing some architectural feature or historical association that made it potentially significant in the context of the surrounding community. Full sound insulation of the structure was initiated in March 2007 and substantially complete in March 2008.

¹⁰⁹ FAA Order 1050.1E, Chg. 1, App. A, sec. 14.5e.

more between DNL 45 dB and 60 dB or increase of DNL 3 dB or more between DNL 60 dB and 65 dB).

Noise modeling indicates that if the Proposed Action were implemented, the historic resources within the APE beyond the MDW environs would be exposed to noise levels ranging from DNL 45 dB to DNL 56.0 dB in 2018. Of the 300 historic resources within the APE, 112 (37.3 percent) would experience an increase in noise exposure of DNL 1 dB or less and 139 (46.3 percent) would experience a decrease in noise exposure. The Quinn Chapel of the A.M.E Church (located in Chicago, Illinois) would experience the greatest predicted change in noise exposure in year 2018. Noise exposure levels at the church would increase by DNL 4.2 dB, from DNL 47.1 dB to DNL 51.3 dB. This change is below reportable levels.

Table 41 summarizes the analysis of noise impacts for historic resources. As shown, none of the historic properties within the APE would experience a significant increase in noise exposure and none would have reportable noise levels. Appendix G lists predicted noise exposure information for the historic resources identified in both the APE and overall study area, for both the Proposed Action and the No Action Alternative.

Table 41 Change of Aircraft Noise Exposure at Historic Properties (2013 and 2018)

Evaluation Criteria	Number of Historic Properties	
	2013	2018
Significant Noise Increase over Historic Properties within the APE		
DNL increase of 1.5 dB or more at or above DNL 65 dB	None	None
Reportable Noise Increase over Historic Properties within the APE		
Reportable DNL increase of 3 dB or more between DNL 60 dB and 65 dB	None	None
Reportable DNL increase of 5 dB or more between DNL 45 dB and 60 dB	None	None
Source: HMMH and URS, 2013		

The FAA found that predicted changes in noise exposure at historic resources in the APE would not alter the characteristics of the historic properties that qualify them for inclusion in the NRHP. Therefore, changes in noise exposure associated with the Proposed Action are not anticipated to have an adverse effect on historic resources.

As noted in Section 4.1, the Proposed Action would not involve construction of any facilities that would create light emissions or create a change to the landscape architecture or viewshed. The visual sight of aircraft, aircraft contrails, or aircraft lights at night is not normally considered to have potential for a significant impact on historic resources. Therefore, the proposed changes in aircraft flight tracks and profiles associated with the Proposed Action would not alter the characteristics of the historic properties that qualify them for inclusion in the NRHP and are not anticipated to have an adverse effect on historic resources.

5.6 AIR QUALITY

This section presents a summary of the analysis of air quality impacts under the Proposed Action and the No Action Alternative.

5.6.1 Overview of Impacts

Implementation of the Proposed Action would result in slightly more fuel burned compared to the No Action Alternative for in study year 2013; however, for study year 2018, the Proposed

Action should result in less fuel burned compared to the No Action. The Proposed Action is presumed to conform to the Illinois State Implementation Plan (SIP). Accordingly, implementation would not cause or contribute to a new violation of the National Ambient Air Quality Standards (NAAQS). Therefore, implementation would not have a significant impact on air quality and a conformity determination is not required.

5.6.2 Methodology

Under FAA Order 1050.1E, significant air quality impacts would occur if an action would exceed one or more of the NAAQS for any of the periods analyzed.¹¹⁰ Section 176(c) of the *Clean Air Act* (CAA) requires that Federal actions conform to the appropriate State Implementation Plan (SIP) in order to attain the CAA's air quality goals. Section 176(c) states: "No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an implementation plan." A conformity determination is not required if the emissions caused by a Federal action would be less than *de minimis* levels established in regulations issued by EPA.¹¹¹

FAA Order 1050.1E provides that further analysis for NEPA purposes is normally not required where emissions do not exceed EPA's *de minimis* thresholds.¹¹² The EPA regulations identify certain actions that would not exceed these thresholds, including ATC activities and adopting approach, departure, and en route procedures for aircraft operations above the mixing height specified in the applicable SIP (or 3,000 ft. AGL in places without an established mixing height).¹¹³ In addition, the EPA regulations allow Federal agencies to identify specific actions as "presumed to conform" (PTC) to the applicable SIP.¹¹⁴ In a notice published in the *Federal Register*, the FAA has identified several actions that "will not exceed the applicable *de minimis* emissions levels" and therefore, are presumed to conform, including ATC activities and adopting approach, departure, and en route procedures for air operations.¹¹⁵ The FAA's "presumed to conform" notice explains that aircraft emissions above the mixing height do not have an effect on pollution concentrations at ground level.¹¹⁶ The notice also specifically notes that changes in air traffic procedures above 1,500 ft. AGL and below the mixing height "would have little if any effect on emissions and ground concentrations."¹¹⁷

As described in Section 5.7, *Natural Resource, Energy Supply (Aircraft Fuel)*, the FAA analyzed the fuel burn resulting from the Proposed Action and the No Action Alternative.

5.6.3 Potential Impacts

Implementing the Proposed Action would result in a slight increase in fuel burn (e.g., 0.33 percent) for 2013 and a slight decrease (0.49 percent) for 2018 in our study area as compared to the No Action Alternative. Increased fuel burn corresponds with an increase in air emissions. However, the Proposed Action would not affect any procedures below 1,500 ft. AGL that would

¹¹⁰ FAA Order 1050.1E, Chg.1, App. A, sec. 2.3.

¹¹¹ *Code of Federal Regulations*, Title 40, sec. 93.153(b).

¹¹² FAA Order 1050.1E, Chg. 1, App. A, sec. 2.1c.

¹¹³ *Code of Federal Regulations*, Title 40, sec. 93.153(c)(2)(xxii).

¹¹⁴ *Ibid.*, sec. 93.153(f).

¹¹⁵ U.S. National Archives and Records Administration, "Federal Presumed to Conform Actions Under General Conformity," *Federal Register* 72, no. 145 (July 20, 2007): 41565-41580.

¹¹⁶ *Ibid.*, 41578.

¹¹⁷ *Ibid.*

cause an increase in fuel or emissions compared to the No Action Alternative. The new procedures, particularly the new GPS/RNP-AR instrument approach to 22L will change flight paths below 1,500 ft.; however, the flights along this path are more streamlined and are expected to spend less time at these altitudes compared to the No Action Alternative. Therefore, although path changes below 1,500 ft. would occur with the Proposed Action, the total duration of the flight below this level would actually decrease. Any operational changes that could result in an increase in fuel burn would occur above 1,500 ft. AGL, with the majority of procedural changes expected to occur above 3,000 ft. AGL.¹¹⁸ Therefore, the overall operational efficiency of the Proposed Action would improve and should result in less delay and ground time compared to the No Action Alternative.

The Proposed Action would result in slightly more fuel burn and air emissions above 1,500 ft. AGL for 2013, as compared to the No Action Alternative. NIRS modeling of the alternatives for each design year substantiated this finding, showing a slight increase in fuel consumption and emissions compared to the No Action Alternative (see Section 5.7.3) for 2013, but a slight decrease in fuel burn for 2018. There are no procedure changes associated with the Proposed Action that are expected to occur below 1,500 ft. AGL that would cause an increase in emissions, as compared to the No Action Alternative. Therefore, no further air quality analysis is necessary and a conformity determination is not required.

The Proposed Action would not affect ground vehicles. Therefore, no increase in ground vehicle use or emissions is expected.

Based on the above analysis, no further air quality analysis is necessary, a conformity determination is not required, and the Proposed Action would not have a significant impact on air quality.

Under the No Action Alternative, the FAA would not implement the Proposed Action. Therefore, no significant changes to the affected environment for air quality (previously described in Section 4.2.5) would occur from the Proposed Action.

5.7 NATURAL RESOURCES, ENERGY SUPPLY (AIRCRAFT FUEL)

This section addresses the potential impacts of the Proposed Action with respect to natural resources and energy supply as compared with the No Action Alternative.

5.7.1 Overview of Impacts

The Proposed Action would result in a relatively small increase in aircraft fuel burned (0.33 percent) in 2013 and a decrease (0.49 percent) in 2018 as compared to the No Action Alternative. The slight increase in 2013 would not be expected to affect local supplies of energy adversely compared to the No Action Alternative. Therefore, the effects of the Proposed Action on natural resources and energy supply would not be significant.

¹¹⁸ Illinois Environmental Protection Agency (IEPA), “Illinois Base Year Ozone Inventory for 2002 (draft).” This inventory is concerned with the emissions occurring when aircraft are on or near the ground, (i.e., within approximately 3,000 ft. AGL, that being the average summer morning mixing height of the atmosphere over Illinois); see “Procedures Vol. IV”, sec. 5.2.2.

5.7.2 Methodology

The NIRS model calculates aircraft-related fuel burn as an output along with calculating aircraft noise exposure. Inputs to NIRS for estimating aircraft-related fuel burn are the same as those used in noise analysis (e.g., AAD flight schedules, flight tracks, and runway use). Refer to Sections 4.2.1, 5.2, and Appendix D for discussions of noise exposure calculation methodology, inputs, and assumptions, which are also applicable to the fuel burn calculation methodology. This analysis uses changes in fuel burn as an indicator of changes in fuel consumption resulting from implementation of the Proposed Action as compared with the No Action Alternative.

According to FAA Order 1050.1E, “For most actions, changes in energy demands or other natural resource consumption will not result in significant impacts. If an EA identifies problems such as demands exceeding supplies, additional analysis may be required in an EIS. Otherwise, it may be assumed that impacts are not significant.”¹¹⁹

5.7.3 Potential Impacts

Table 42 presents the results of the fuel burn analysis for the Proposed Action and No Action Alternative. Compared with the No Action Alternative, the Proposed Action would result in 1.6 MT (0.33 percent) more fuel burned in 2013, and 2.7 MT (0.49 percent) less fuel burned in 2018. Given the relatively small increase in 2013, the FAA expects that the Proposed Action would not adversely affect local fuel supplies when compared with the No Action Alternative. Therefore, the effects of the Proposed Action on natural resources and energy supply would not be significant.

Table 42 Comparison of Energy Consumption (2013 and 2018)

	2013		2018	
	No Action Alternative	Proposed Action	No Action Alternative	Proposed Action
Fuel Burn (MT)	491.3	493.0	553.3	550.6
Volume Change (MT)	0	1.6	0	-2.7
Percent Change (Proposed Action minus No Action / Divided by No Action) (MT)	0.00%	0.33%	0.00%	-0.49%
Source: HMMH, 2013				

5.8 CLIMATE

This section presents a summary discussion of climate and greenhouse gas (GHG) emissions, as they relate to the Proposed Action and the No Action Alternative.

5.8.1 Overview of Impacts

Although fuel burn would increase slightly with the Proposed Action compared to the No Action Alternative for 2013, no significant project-related effects on climate are expected.

5.8.2 Methodology

In accordance with FAA guidance,¹²⁰ estimated CO₂ emissions were calculated from the amount of fuel burned under the No Action Alternative and the changes in fuel burn projected

¹¹⁹ FAA Order 1050.1E, Chg. 1, App. A, sec. 13.2b.

¹²⁰ FAA Order 1050.1E, Chg. 1, Guidance Memo #3., “Considering Greenhouse Gases and Climate Under the National Environmental Policy Act (NEPA): Interim Guidance,” January 12, 2012.

for the Proposed Action in 2013 and 2018 (see Section 5.7). The resulting increases in CO₂ emissions for 2013 were then calculated as a percentage of national and global CO₂e totals from all GHG sources.

5.8.3 Potential Impacts

Table 43 shows the project related CO₂e emissions.¹²¹ CO₂ emissions under the Proposed Action would be 1,890 MT of CO₂e, or one-third (1/3) of a percent more than the No Action Alternative in 2013 and 3,123 MT of CO₂e, or approximately one-half (1/2) of a percent, less in 2018. The increase in 2013 would comprise less than 0.0000651 (6.51^{E-05}) percent of U.S. based GHG emissions¹²² and less than 0.00000385 (3.85^{E-06}) percent of global GHG emissions.¹²³ Therefore, the FAA does not expect the Proposed Action to have a significant effect on climate.

Table 43 Comparison of CO₂ Emissions (2013 and 2018)

	2013		2018	
	No Action Alternative	Proposed Action	No Action Alternative	Proposed Action
CO ₂ Emissions (MT of CO ₂ e)	565,802	567,692	637,125	634,002
Proposed Action minus No Action (MT of CO ₂ e)	--	1,890	--	-3,123
Percentage Change	--	0.33%	--	-0.49%
Source: HMMH, 2013				

5.9 FISH, WILDLIFE, AND PLANTS

This section presents a summary of the analysis of impacts to fish, wildlife, and plants (including airborne species such as birds and bats) under the No Action Alternative and Proposed Action.

5.9.1 Overview of Impacts

The No Action Alternative assumes that the FAA would not implement the Proposed Action; therefore, fish, wildlife, and plants would not be affected. The Proposed Action would not affect fish, plants, terrestrial wildlife, or their habitats because the Proposed Action does not involve land disturbing activities. The Proposed Action is not expected to result in increased wildlife strikes when compared with the No Action Alternative because the proposed changes would cover a similar geographic area and duration as existing conditions and would occur primarily above 2,500 ft. AGL, where the FAA's Wildlife Strike Database has reported only a small proportion of strikes. Furthermore, MDW has reported only nine strikes of threatened and endangered species in over 20 years and, as proposed changes are similar to existing conditions, the Proposed Action would not appreciably increase the risk of impact on threatened and endangered species. Therefore, the Proposed Action is not likely to affect listed species or critical habitat adversely.

¹²¹ As discussed in Section 4.2.7.1, CO₂ emissions are equivalent to CO₂e emissions for this analysis.

¹²² The EPA reports national CO₂e emission totals of 3.2 billion tons CO₂e for 2010. EPA, "Greenhouse Gas Reporting Program (GHGRP) 2010: Reported Data":

<http://www.epa.gov/ghgreporting/ghgdata/reported/index.html>

¹²³ The Intergovernmental Panel on Climate Change (IPCC) estimates global GHGs in 2004 at 49 Gigatonnes CO₂e, with CO₂ being the single largest source. IPCC, Working Group III, "Summary for Policymakers," 9th Session, Bangkok, Thailand, April 30 – May 4, 2007.

5.9.2 Methodology

Potential impacts to fish, wildlife, and plants were evaluated in accordance with FAA Order 1050.1E. A significant impact would occur if the Proposed Action would jeopardize the continued existence of Federally listed threatened or endangered species or result in the destruction or adverse modification of critical habitat for any species. Potential impacts to state-listed endangered or threatened species must also be considered under FAA Order 1050.1E, Appendix A, Section 8.1. The Proposed Action would not involve land acquisition, construction, or other ground disturbance activities. The Proposed Action would not increase the number of aircraft operations when compared to the No Action Alternative. However, the Proposed Action would change the flight paths and profiles used by aircraft navigating the airspace within the study area. Analysis of potential impacts to airborne wildlife, including migratory bird species and Federally or state listed species, involved review of the FAA Wildlife Strike Database for 1990-2010. This database provides a variety of useful information to evaluate the potential for wildlife strikes as a result of the Proposed Action including wildlife variety (species or group) and altitude of strike occurrence.

The analysis of potential wildlife strikes associated with the Proposed Action and No Action Alternative was based on a review of arrival and departure flight tracks for MDW. Because FAA data indicate that 92 percent of all wildlife strikes nationally occur below 3,500 ft. AGL, this analysis compared modifications in flight procedures both above and below 3,500 ft. AGL to the occurrence of species and populations of concern to assess if the frequency of wildlife strikes might change under the Proposed Action.

5.9.3 Potential Impacts

The No Action Alternative for 2013 and 2018 assumes that the Proposed Action would not be implemented; therefore, impacts to existing land use/vegetative cover, wildlife, migratory birds, or threatened and endangered species would not occur.

The Proposed Action would not involve land acquisition, construction, or other ground disturbing activities, so the potential for impacts to fish, wildlife, and plants would be restricted to airborne wildlife strikes to aircraft. The Proposed Action would shift the flight paths and profiles used by aircraft but would not increase the number of aircraft operations as compared to the No Action Alternative for the same study year. The Proposed Action would decrease the distance and time that aircraft fly at altitudes below 3,500 ft. AGL where the FAA's Wildlife Strike Database indicates the majority of strikes occur. Since most of the changes to flight paths for the Proposed Action occur above 3,500 ft. AGL, the potential for collisions between aircraft and airborne wildlife does not significantly change when compared to the No Action Alternative. Furthermore, MDW has recorded no strikes involving Federally listed threatened and endangered species, and only 10 strikes that involve state listed threatened and endangered species, in the 21 years for which data are available. As the Proposed Action would not alter the number or type of aircraft operations at MDW, no increased risk of impacts to Federally- or state-listed species or migratory birds are expected to occur. Therefore, there are no anticipated adverse effects to airborne wildlife, including migratory birds and Federally- or state-listed species.

5.9.3.1 Wildlife Strikes

Incidents involving the collisions between wildlife and aircraft have been recorded and compiled into the FAA Wildlife Strike Database, and contains records from 1990 to present. Nationwide,

the database has record of 105,947 wildlife strikes that have occurred in the 21-year period between 1990 and 2010. Of this total, 97.6 percent of the strikes involved birds (97.1 percent) and bats (0.5 percent). For bird strikes, 92 percent occur at or below 3,500 ft. AGL.

Specifically for MDW, the database has recorded 892 wildlife strikes. Of this total, 99.7 percent were birds (99.6 percent) and bats (0.1 percent); and the remaining 0.3 percent were terrestrial animals. The strike database includes specific identification for 33 airborne species and non-specific identification of 14 wildlife groups (e.g., gulls, hawks, unknown bird – small). The species identified in the highest numbers of strikes include the American kestrel (241), ring-billed gull (72), rock pigeon (31), red-tailed hawk (23), and mourning dove (20). Together, these species were involved in 83.6 percent of the strike occurrences in which the species was identified, which also translates to 42.1 percent of all recorded strikes. The non-specifically identified wildlife groups accounted for 47.9 percent of all recorded strikes.

The data for MDW includes a large number of records that did not identify one or more elements of the information necessary to performing strike analysis, such as the altitude at which the strike occurred and the species involved in the strike. However, the data for MDW does contain 491 records (55 percent of all recorded strikes) that include strike altitude. For the records that include strike altitude data, 87.6 percent of strikes occurred at altitudes at or below 3,500 ft. AGL, leaving 12.4 percent occurring above that altitude. Table 44 provides a summary of the strike analysis by wildlife type and the altitude range of the strike. For the 430 records that contain both the altitude and species or wildlife group information for the strike occurrence, 98.3 percent of strikes occurred at altitudes at or below 3,500 ft. AGL and 1.7 percent occurred above that altitude. The species identified with the highest number of strikes where altitude and species data were both available are the American kestrel (31), rock pigeon (15), ring-billed gull (15), red-tailed hawk (8), mourning dove (5), Canada goose (4), and European starling (4). Two (2) species have been identified in the three (3) strikes that occurred above 3,500 ft. AGL, the Canadian goose (2) and the common tern (1).

Table 44 Midway Airport Wildlife Strikes (1990-Present)

Category of Airborne Wildlife	3,500 ft. AGL or Less	>3,500 ft. AGL	Total
Bat ¹	0	0	0
Identified Bird ²	175	3	178
Unknown bird	2	0	4
Unknown bird - large	7	2	9
Unknown bird - medium	98	31	129
Unknown bird - small	148	25	173
Unknown bird or bat ³	0	0	0
Total ⁴	430	61	491
Percent	87.6%	12.4%	100%
Notes: 1. For the 21-year period, two bat strikes were recorded but lack strike altitude information. In this category, 27 individual species and eight specific groups (i.e., gulls, hawks, and sparrows) are represented. 2. The American kestrel, ring-billed gull, rock pigeon, red-tailed hawk, mourning dove, Canadian goose, and European starling account for 87 percent of strikes attributable to a specific species and for which altitude information is available. 3. For the 21-year period, one unknown bird or bat strike was recorded but lacks strike altitude information. 4. Only records that include strike altitude data are included. Source: FAA, "Wildlife Strike Database"			

The Proposed Action would alter flight paths below 3,500 ft. AGL. However, the proposed changes would decrease the time and distance that aircraft travel below the 3,500 ft. AGL threshold. Therefore, it would follow that the Proposed Action would decrease the risk of

airborne wildlife strikes within the portion of the air space where the majority of bird and bat strikes occur. For the route changes above the 3,500 ft. AGL, the proposed flight paths would bring transiting aircraft over similar geographic features to those currently overflown. Therefore, the Proposed Action is expected to generate a similarly small number of strikes for this portion of the flight path as that experienced with the No Action Alternative.

5.9.3.2 Threatened and Endangered Species

While there are no strikes recorded for MDW that involve Federally listed threatened or endangered species, three state-listed species have been recorded in the strike database. The short-eared owl, barn owl, and the peregrine falcon were involved in nine (9) strikes, or approximately one percent of the total number of strikes, for the entire 21-year recording period. The status of all three species is listed as endangered in all three states within the GSA with the one exception of the peregrine falcon, which is listed as threatened in Illinois. For reasons previously stated, the Proposed Action would bring transiting aircraft over similar geographic features for similar durations to those currently overflown under the No Action Alternative. Therefore, the number of bird strikes involving species protected under either the Federal or the three state's rules is not anticipated to increase over that of the No Action Alternative.

5.9.3.3 Migratory Birds

Of the 33 specifically identified species of birds in the strike database for MDW, 28 are listed as protected under the Migratory Bird Treaty Act (MBTA). The changes to the flight paths in the Proposed Action would not route aircraft into a different Migratory Bird Flyway. As previously stated, the Proposed Action would bring transiting aircraft over similar geographic features for similar durations to those currently overflown in the existing condition and, by extension, the No Action Alternative. Therefore, it would follow that the Proposed Action would not increase the risk of migratory bird strikes within the portion of the air space where the majority of birds are expected to occur. Therefore, the number of bird strikes involving species protected under the MBTA is not expected to increase under the Proposed Action as compared to the No Action Alternative.

5.10 ENVIRONMENTAL JUSTICE

This section presents a summary of the analysis of environmental justice under the Proposed Action and the No Action Alternative. Section 4.3.9 provides information on the distribution of these populations within the study area.

5.10.1 Overview of Impacts

The No Action Alternative would not include any ground disturbance, construction, or land acquisition; therefore, the No Action Alternative would not result in disproportionately high and adverse effects on minority and low income populations, and there would be no environmental justice impacts.

The Proposed Action would result in a DNL 1.5 dB increase in noise exposure for census blocks within the DNL 65 dB contour. This exceeds the threshold indicating a significant noise impact pursuant to FAA Order 1050.1E. The affected census blocks have higher minority populations when compared to the detailed study area, as identified in Figures 28 and 29. Although the Proposed Action would constitute a significant noise impact within several census blocks, and could potentially represent a disproportionately high and adverse effect, the availability of

mitigation in the form of sound insulation would reduce noise impacts to less than significant levels.

5.10.2 Methodology

Under FAA Order 1050.1E, “When FAA determines that a project has significant effects pursuant to NEPA, the potential for disproportionately high and adverse effects pursuant to environmental justice must be analyzed.”¹²⁴ The FAA examines environmental justice during evaluation of other impact categories, such as noise, air quality, water, hazardous materials, and cultural resources.

Although environmental justice was considered during the evaluation of other environmental impact categories, changes in the noise environment in the vicinity of MDW had the greatest potential for generating substantial impacts. Therefore, noise impacts on minority and below poverty populations were evaluated in more detail. To evaluate noise impacts, FAA Order 1050.1E, Appendix A, sec. 14.4g, requires DNL contours, grid point, and/or change of exposure analysis to be prepared for the future conditions, both with and without the Proposed Action and each reasonable alternative. For this EA, the Proposed Action and No Action Alternatives were evaluated for the study years 2013 and 2018. Paragraph 14.4b requires that the determination of significance be obtained considering local land use information and general guidance contained in *Code of Federal Regulations*, Title 14, Part 150, Appendix A. FAA Order 1050.1E, sec. 14.3 states that a Proposed Action would have a significant impact with regard to aviation noise, when compared to the No Action Alternative for the same timeframe, if it would have the following effects:

- Cause noise sensitive areas exposed to DNL 65 or higher to experience a noise increase of at least DNL 1.5 dB
- Cause an increase of DNL 1.5 that introduces new noise sensitive areas to exposure levels of DNL 65 dB or greater

In compliance with FAA Order 1050.1E, Appendix A, sec. 14.4c, the FAA evaluated noise sensitive areas for significant changes in noise exposure (i.e., increase of DNL 3 dB or more for areas of DNL 65 or greater) and reportable (i.e., increase of DNL 5 dB or more between DNL 45 dB and 60 dB or increase of DNL 3 dB or more between DNL 60 dB and 65 dB). Due to the areal extent and diversity of the overall study area, the analysis of environmental justice impacts evaluated two distinct geographic areas: the approximately 10,402 NM² study area shown in Figure 17; and a detailed study area consisting of census block groups located within one half mile of DNL 65 dB noise contour for MDW as shown on Figures 28 and 29. For the identified study areas, the FAA queried the GIS database developed for this EA for the number and percentage of minority and low-income populations that may experience a significant noise increase. Finally, this analysis resulted in disclosure of a comparison of the number and percentage of minority and low-income populations that may experience a significant noise increase because of the Proposed Action.¹²⁵

¹²⁴ FAA Order 1050.1E, Chg. 1, App. A, sec. 16.2a.

¹²⁵ US Census Bureau data is presented in terms of geographic units, the smallest of which is a Census block (“block”). A “block group” contains two or more blocks. Population counts and minority populations are reported at the block level; however, income and poverty data are only reported to the block group level. For the analysis in

5.10.3 Potential Impacts

This section provides analysis and results of the impacts anticipated from implementation of the Proposed Action.

5.10.3.1 MDW Environs

Under the No Action Alternative, the Proposed Action would not be implemented. Therefore, the No Action Alternative would not result in a disproportionately high and adverse human health or environmental effects on minority and low income populations. Therefore, no environmental justice impacts would occur.

As noted in Section 5.2, the Proposed Action would result in reportable and significant noise impacts associated with minority and low-income populations. As discussed in Section 5.3.3.1, newly incompatible land uses would be evaluated and mitigation measures would be proposed under the framework of the CDA's existing Part 150 program. Eligibility for participation is determined without regard to race, color, creed, national origin, gender, or household income levels. No disproportionately significant impact would occur under the Proposed Action. However, even in the absence of significant impacts, CEQ and FAA guidance encourages analysis and disclosure of effects upon minority and low-income populations, presented in detail in this section.

Under the No Action Alternative, populations in the vicinity of MDW airport would continue to be exposed to elevated levels of aircraft noise, including low-income and minority populations. The "2013 Part 150 Study Update" allows for mitigation of aviation noise to more housing units, including housing units occupied by low-income or minority populations. These communities were afforded the opportunity to comment on both the Part 150 Study Update and this EA, along with the general public.

FAA Order 1050.1E, Appendix A, sec. 14.3 states thatB "A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe." In study year 2013, the number of high minority and low income populations experiencing a DNL increase of 1.5 dB or more above DNL 65 dB would increase by eight (8) and eleven (11) census blocks, respectively. In study year 2018, the number of high minority and low income populations experiencing a DNL increase of 1.5 dB or more above DNL 65 dB would increase by nine (9) and thirteen (13) census blocks, respectively. Figures 28 and 29 illustrate the locations of the census block groups containing these blocks within this detailed study area surrounding MDW. Tables 45 through 47 provide data on race/ethnicity and low-income populations within the census blocks.

this EA, analysis of minority populations was conducted using block data. For income and poverty analysis, the parent block group data were used to populate the block level data elements. Figures 28 and 29 show block groups.

Table 45 Summary of Noise Exposure for Minority and Low-Income Populations – Proposed Action (2013 and 2018)

Evaluation Criteria	Number of Census Blocks (Study Year 2013)		Number of Census Blocks (Study Year 2018)	
	High Minority Population ¹	Low Income ²	High Minority Population ¹	Low Income ²
Reportable DNL increase of 5 dB or more between DNL 45 dB and 60 dB	None	None	39	49
Reportable DNL increase of 3 dB or more between DNL 60 dB and 65 dB	None	None	None	None
Significant noise increase of DNL 1.5 dB or more at or above DNL 65 dB	8/1 ³	11/4	9/1	13/5
Notes: 1. For this EA, the FAA identified a census block group having a minority population greater than 58.9 percent as a census block group of environmental justice concern. 2. A low-income block group is a group having a low-income population percentage greater than the average low-income population in the study area. The average poverty threshold in the study area for this EA was \$20,000 per household. 3. Total number of Census Blocks experiencing a noise increase of DNL 1.5 dB or more at or above DNL 65 dB / number of Census blocks newly included within the DNL 65 dB noise exposure level. Source: HMMH and URS, 2013				

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Chicago Midway

Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Approximate Airport Boundary
- Airports
- Airport Runway
- 2013 No Action DNL Contour
- 2013 Proposed Action DNL Contour
- Areas Considered for Environmental Justice (2010 Census Block Groups)

2013 Change in Noise DNL Levels

Noise Increases

- 1.5 dB or greater for location with a Proposed Action DNL \geq 65 dB

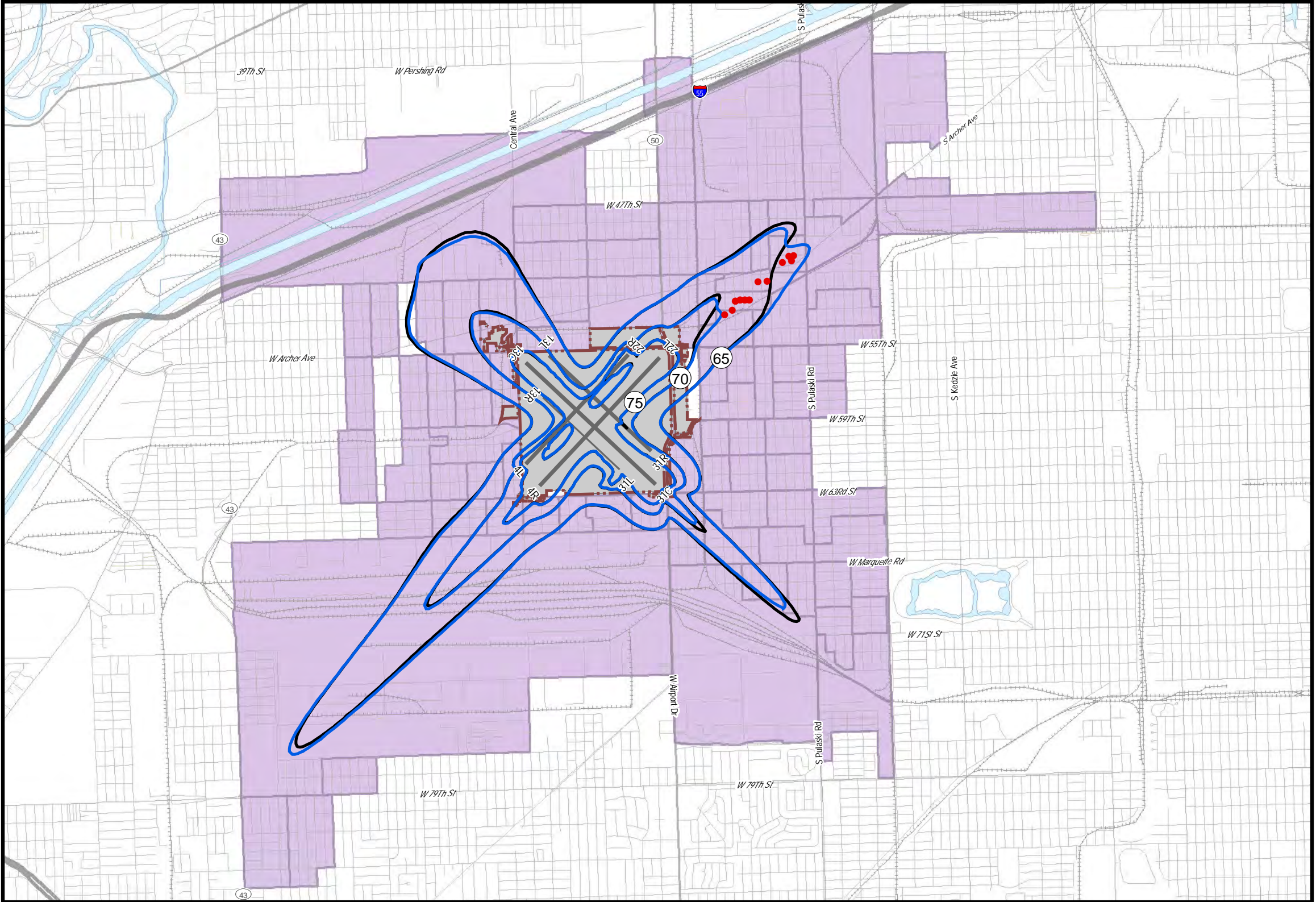
Noise Decrease

- 1.5 dB for location with a No Action DNL \geq 65 dB

- Highways
- Secondary Highways
- Railroad
- Water Body
- Stream / Shore Line

Notes:
Points shown represent 2010 Census Block Centroids

Path: H:\GIS\USAINL\304050_MDW_Figure28_PopExposed_to_Aircraft_Noise_2013_EJ.mxd



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; L&B, MDW Part 150 (Noise Contours) February 7, 2013; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

Figure 28

Population Exposed to Aircraft Noise in
Areas Considered for Environmental Justice (2013)

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Chicago Midway

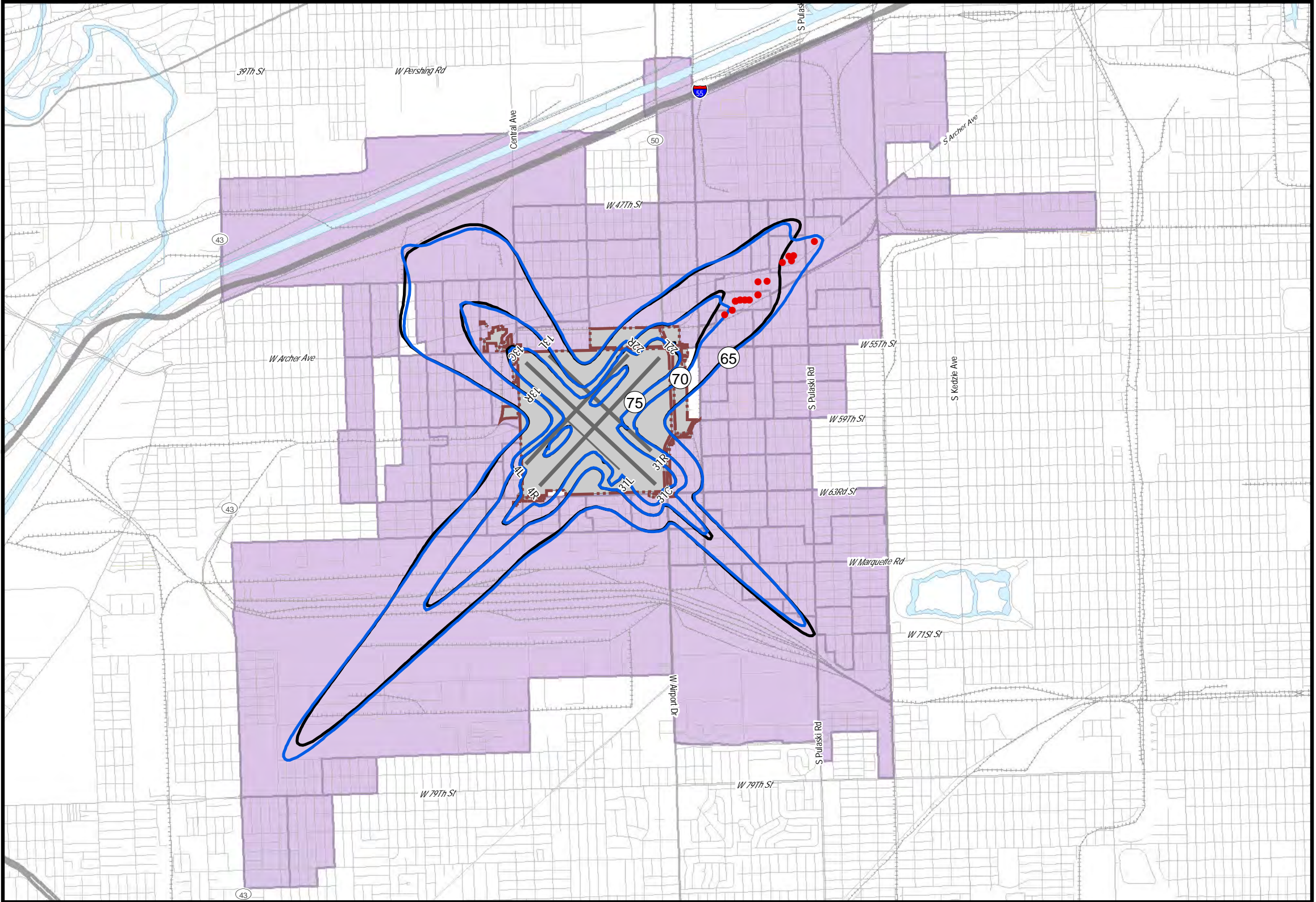
Air Traffic Procedural Changes, Environmental Assessment

Legend:

- Approximate Airport Boundary
- Airports
- Airport Runway
- 2018 No Action DNL Contour
- 2018 Proposed Action DNL Contour
- Areas Considered for Environmental Justice (2010 Census Block Groups)
- 2018 Change in Noise DNL Levels**
 - Noise Increases**
 - 1.5 dB or greater for location with a Proposed Action DNL \geq 65 dB
 - Noise Decrease**
 - 1.5 dB for location with a No Action DNL \geq 65 dB
- Highways
- Secondary Highways
- Railroad
- Water Body
- Stream / Shore Line

Notes:
Points shown represent 2010 Census Block Centroids

Path: H:\GIS\USAINL\304050_MDW_Figure29_PopExposed_to_Aircraft_Noise_2018_EJ.mxd



Data Source: Environmental Systems Research Institute, Inc.(ESRI) (Airports/Airport Runways), February 8, 2012; L&B, MDW Part 150 (MDW Property Boundary) February 13, 2013; L&B, MDW Part 150 (Noise Contours) February 7, 2013; ESRI (Roads), March 14, 2012; National Atlas (Water Features), July 18, 2012; National Atlas (Lakes/Rivers), July 18, 2012; (Updated); Illinois DNR (Wetlands) February 11, 2013; US Census Bureau (Census Block, Block Group Data), July 19, 2012; Prepared By: Harris Miller Miller & Hanson Inc., May, 2013

Figure 29
Population Exposed to Aircraft Noise in
Areas Considered for Environmental Justice (2018)

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Table 46 Race/Ethnicity within Noise Sensitive Areas – Proposed Action (2013 and 2018)

Race/Ethnic Group	Proposed Action 2013 High Minority Census Block ⁴ (Percent of People)								Proposed Action 2018 High Minority Census Block ⁴ (Percent of People)								
	170315705001001	170315705001012	170315705002004	170315705002005	170315705002006	170315705002007	170315705002008	170315703002013	170315705001001	170315705001012	170315705002002	170315705002004	170315705002005	170315705002006	170315705002007	170316202002008	170315703002013
White	25.0	21.5	29.3	14.4	23.2	21.1	18.2	40.0	25.0	21.5	29.2	29.3	14.4	23.2	21.1	18.2	40.0
African American	7.6	0	1.3	0	1.2	0	6.1	0	7.6	0	0	1.3	0	1.2	0	6.1	0
American Indian/Eskimo	0	0	0	0	0	1.1	0	0	0	0	0	0	0	0	1.1	0	0
Asian/ Pacific Islander ¹	3.3	1.9	5.3	0	0	0	1.0	0	3.3	1.9	0	5.3	0	0	0	1.0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Multi-Race	0	0	0	0	0	1.1	0	0	0	0	0	0	0	0	1.1	0	0
Hispanic/Latino ²	64.1	76.6	64.0	85.6	75.6	76.8	74.7	60.0	64.1	76.6	70.8	64.0	85.6	75.6	76.8	74.7	60.0
Total ³	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Notes:

1. Asian and Hawaiian were combined to form Asian/Pacific Islander for comparison purposes.
2. As defined by the U.S. Census, a Hispanic person are persons of Hispanic origin, in particular, were those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. It should be noted that persons of Hispanic origin might be of any race. For this analysis, each racial category includes only the non-Hispanic portion of that population group. The Hispanic ethnic group includes all persons of Hispanic origin, regardless of racial makeup. This approach has the benefit of not double counting individuals by both their race and Hispanic ethnicity.
3. Percentages may not add to 100 percent due to rounding.
4. For this EA, the FAA identified a census block group having a minority population greater than 58.9 percent as a census block group of environmental justice concern.

Source: U.S. Census Bureau, 2007-2011 American Community Survey 5-Year Estimates, 2012.

Table 47 Low-Income Population within Noise Sensitive Areas – Proposed Action (2013 and 2018)

Census Block	Low Income ¹ Difference Contour DNL 1.5 dB in the DNL 65 dB Noise Contour	
	Proposed Action 2013 (Percent of Households) ²	Proposed Action 2018 (Percent of Households) ²
170315703002017	17.5	17.5
170315703002012	17.5	17.5
170315703002016	17.5	17.5
170315703002013	17.5	17.5
170315704002019	-NA-	16.6
170315705002004	17.8	17.8
170315705002002	-NA-	17.8
170315705002005	17.8	17.8
170315705002006	17.8	17.8
170315705002007	17.8	17.8
170315705002025	17.8	17.8
170316202002009	13.7	13.7
170316202002008	13.7	13.7

Notes:

1. A low-income block group is a group having a low-income population percentage greater than the average low-income population in the study area. The average low-income threshold in the study area for this EA was \$20,000 per household. The average low-income percentage for block groups in the study area for this EA is 13.5 percent.
2. The U.S. Census Bureau's, 2007-2011 American Community Survey 5-Year Estimates aggregates income data to the block group level. Census blocks are subdivisions (parts) of a block group. Therefore, the census block centroids, used for determining potential impacts in this EA, were assigned the income data from their respective "parent" block group. The result is that all census block within the same block group will have the same values for income related data.

Source: U.S. Census Bureau, 2007-2011 American Community Survey 5-Year Estimates, 2012.

As discussed in Section 4.3.9, the FAA identified census block groups with a percentage of low-income population greater than 13.5 percent as a census block group of environmental justice concern. The census blocks and block groups that have significant noise increases have a low-income populations ranging from 13.7 percent to 17.8 percent of the total population. Likewise, the FAA identified census block groups with a percentage of minority population greater than 58.9 percent as a census block group of environmental justice concern. The census blocks that have significant noise increases have minority populations that range from 70.7 percent to 85.6 percent of the total population. Within these census blocks, the Hispanic/Latino minority group comprises the largest minority group (approximately 64.0 percent to 85.6 percent of the minority population). The affected census blocks have higher minority populations when compared to the overall minority population of the detailed study area surrounding MDW.

5.10.3.2 Study Area beyond Midway Environs

No census blocks within the DNL 60 dB and 65 dB range of noise exposure would experience an increase in noise levels of DNL 3 dB or greater as a result of the Proposed Action in either 2013 or 2018. No census blocks within the DNL 45 dB and DNL 60 dB range of noise exposure would experience a DNL increase of 5 dB in 2013. In 2018, however, 40 census blocks with a high-minority population and 50 census blocks with low-income populations within the DNL 45-60 dB range would experience a DNL increase of 5 dB. This is a reportable change in noise exposure. Figure 29 depicts the location of these blocks.

The distribution of the census blocks having only reportable noise increases reflects the general pattern of both low-income and minority populations in the more urban portions of the study area closer to MDW and does not indicate a disproportionately greater impact than would be

experienced by other population segments. Accordingly, there would be no significant environmental justice impacts to these minority and low-income populations. These changes in noise exposure are reportable but not considered significant, in accordance with FAA Order 1050.1E, Appendix A.

5.11 CUMULATIVE IMPACTS

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action with other actions. CEQ regulations state that a cumulative impact “is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”¹²⁶

5.11.1 Overview of Impacts

The implementation of the Proposed Action when considered with other past, present and reasonably foreseeable future actions would not be expected to result in significant cumulative impacts.

5.11.2 Methodology

To assess cumulative effects, the incremental impacts associated with the Proposed Action were considered in conjunction with the effects of other past, present, or reasonably foreseeable future projects to determine whether they would cause significant effects. Reasonably, foreseeable future actions refer to those projects with implementation likely in the year 2013 or later. They would be actions that a proponent would likely complete and for which plans have been developed with enough specificity to provide meaningful information to a decision maker and the interested public.

Given the nature of the proposed airspace project, its relatively low level of environmental impact, and the expansive extent of the study area, the FAA did not compile a definitive list of every past, present, and foreseeable project within the study area. The FAA conducted a qualitative screening based on the fact that potentially significant impacts would likely occur in close proximity to MDW and that the potential for regional impacts were limited mostly to aircraft noise and air quality. Therefore, the FAA considered projects at MDW in more detail and evaluated potential regional impacts in a broader manner commensurate with the anticipated level of impact associated with the Proposed Action.

In determining the significance of cumulative effects, the same thresholds of significance used to identify impacts that apply individually to the Proposed Action would also apply. Environmental impact categories that were not affected by the Proposed Action (see Section 4.1) were not examined for cumulative impacts because there would be no potential for the Proposed Action to cumulatively affect those environmental impact categories. Similarly, where analyses in this EA indicated that the Proposed Action would have a neutral effect, or lack of an adverse effect, on an environmental impact category that impact category was not examined for potential cumulative impact.

¹²⁶ *Code of Federal Regulations*, Council on Environmental Quality Regulations, Title 40, §1508.7.

5.11.3 Potential Impacts

Table 48 presents a summary of the past, present, and future projects at MDW and considers their cumulative effects related to the Proposed Action and No Action Alternative. Table 49 presents projects at other airports, airspace actions, and development projects in the study area for examination of potential for cumulative effects. Further analysis of potential cumulative impacts, by environmental resource category, follows the tables.

When reviewing the information in Tables 46 and 47, consideration should be given to the fact that developing future projects have the opportunity and would likely incorporate design features and best management practices that avoid or minimize potential environmental and social impacts. Mitigation may also be provided where unavoidable impacts occur.

Table 48 Potential for Cumulative Impacts with the Proposed Action and No Action Alternative at Midway Airport

Project / Description	Potential for Cumulative Effects
Rehabilitation of Runway 4R/22L	Temporary construction-related air emissions (equipment and paving); temporary water quality concerns (i.e., grading and equipment fuel storage); and construction waste; NEPA completed in March 2008; no significant cumulative impacts are expected with the Proposed Action.
Repair and replacement of existing Runway 4R/22L pavement; including associated lighting, signage, pavement marking, and related improvements	
Purchase of 6301 S. Cicero Avenue and 4735-41 W. 63rd Street (Parcels 133 & 134)	Temporary air quality and water quality impacts associated with land clearing and building demolition activities; NEPA completed March 2008; no significant cumulative impacts are expected with the Proposed Action.
Acquisition of two parcels of land; included relocation and land clearing activities	
Concourse A Additions	Temporary construction-related air emissions; temporary water quality concerns during construction; and construction waste; NEPA completed in August 2008; no significant cumulative impacts are expected with the Proposed Action.
Construction of new passenger concourse building, including building renovation, and aircraft ramp improvements	
Residential and School proofing, EDS - In Line Baggage System & Vehicle Acquisitions	Minor and temporary construction-related impacts associated with building renovations and expansion; NEPA completed in December 2008; no significant cumulative impacts are expected with the Proposed Action.
Noise attenuation improvements at residences and education structures; installation of baggage screening and sorting equipment at MDW; purchase of vehicles for airport operations	
North Hall Security Expansion	Minor and temporary construction-related impacts associated with building renovations and expansion; NEPA completed in August 2008; no significant cumulative impacts are expected with the Proposed Action.
Expansion of existing structure to accommodate security operations.	
Construction of Runway 31C High-Speed Exit to Taxiway A	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste. NEPA completed in March 2011; minor increases in impervious surface at MDW; no significant cumulative impacts are expected with the Proposed Action.
Construction of new taxiway pavement, including grading and drainage improvements and installation of edge lights, signage, and pavement markings	
Rehabilitation of Runway 13L-31R and 31C Hold Pad	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste; NEPA completed in June 2011; no significant cumulative impacts are expected with the Proposed Action.
Repair and replacement of existing runway and hold pad pavements; also including lighting, signage, pavement marking, and related improvements	
Rehabilitation of Airside Service Road	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste; NEPA completed in August 2011; no significant cumulative impacts are expected with the Proposed Action.
Repair and replacement of existing airside service road pavements; also including pavement marking and related improvements	
Redevelopment of Parcels 133 and 134	Temporary construction-related air emissions; temporary water quality concerns; and construction waste; NEPA completed in August 2011; no significant cumulative impacts are expected with the Proposed Action.
Release of 8.79 acres of land	
Release of land from airport ownership and federal grant obligations	NEPA completed in December 2011; no significant cumulative impacts are expected with the Proposed Action.

Project / Description	Potential for Cumulative Effects
Rehabilitation of existing Taxiway (TW) Y, A South-10(0), TW South-10(69), TXD- 10(48), TWK-50(25) and TWG-20185 Repair and replacement of existing taxiway pavements; also including lighting, signage, pavement marking, and related improvements Installation of Centerline and Threshold Lights on Runway 4R/22L	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste; NEPA completed in December 2011; no significant cumulative impacts are expected with the Proposed Action.
Installation of new centerline lights and replacement of runway threshold lights Demolition of the former Odyssey Aviation Facility (5300-5322 W. 63rd Street) Building demolition and site clearing activities	Temporary construction-related air emissions and construction waste; NEPA completed in June 2012; no significant cumulative impacts are expected with the Proposed Action.
Rehabilitation of Taxiways Y, K and D and South Ramp area (between Runways 4R and 31L) Repair and replacement of existing taxiway pavements; also including lighting, signage, pavement marking, and related improvements	Temporary air quality and water quality impacts associated with building demolition activities; NEPA completed December 2012; no significant cumulative impacts are expected with the Proposed Action.
Runway 13C/31C Rehabilitation and Lighting Study Repair and replacement of existing runway pavement; including lighting, signage, pavement marking, and related improvements	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste; NEPA completed in January 2013; no significant cumulative impacts are expected with the Proposed Action.
Taxiway P Reconfiguration at Runway 4L/22R Construction of new taxiway pavement; including grading and drainage improvements and installation of edge lights, signage, and pavement markings	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste; NEPA analysis to be undertaken by FAA and the CDA to characterize construction and operational impacts; no significant impacts are expected with the Proposed Action.
Runway 4L/22R Rehabilitation Repair and replacement of existing runway pavement; including lighting, signage, pavement marking, and related improvements	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction (i.e., grading and equipment fuel storage), and construction waste. NEPA analysis to be undertaken by FAA and the CDA to characterize construction and operational impacts; no significant impacts are expected with the Proposed Action.
Acquisition of Parcel at 55th & Linder for RSA/RPZ Protection Purchase of land, relocation, and land-clearing activities	Temporary air quality and water quality impacts associated with land clearing and building demolition activities; underground fuel tanks present, potential for hazardous materials; relocation required; NEPA analysis to be undertaken by FAA and the CDA to characterize construction and operational impacts; no significant impacts are expected with the Proposed Action.
Runway 13C/21C Rehabilitation and Lighting Repair and replacement of existing runway pavement; including lighting, signage, pavement marking, and related improvements	Temporary construction-related air emissions (equipment and paving), temporary water quality concerns during construction, and construction waste; NEPA analysis to be undertaken by FAA and the CDA to characterize construction and operational impacts; no significant impacts are expected with the Proposed Action.
Acquisition of Parcel at 55th & Luna for RSA/RPZ Protection Purchase of land, relocation, and land-clearing activities	Temporary air quality and water quality impacts associated with land clearing and building demolition activities; relocation required; NEPA analysis to be undertaken by FAA and the CDA to characterize construction and operational impacts; no significant impacts are expected with the Proposed Action.
Acquisition of Parcel at 64th & Cicero for RSA/RPZ Protection Purchase of land, relocation, and land-clearing activities	Temporary air quality and water quality impacts associated with land clearing and building demolition activities; relocation required; NEPA analysis to be undertaken by FAA and the CDA to characterize construction and operational impacts; no significant impacts are expected with the Proposed Action.
Proposed Construction and Operation of an Army Aviation Support Facility (AASF) and Readiness Center at the Greater Kankakee Airport in Kankakee, Illinois and Relocation of the Illinois Army National Guard (ILARNG) Operations and Personnel from existing facilities at MDW to new facility at Greater Kankakee Airport	In January 2013, the FAA published a Draft EA for the proposed relocation of the Illinois Army National Guard operations from MDW to the Kankakee Airport; no significant noise, air quality, historic, socioeconomic, or Section 4(f) impacts at MDW.
FAA Maintenance of the National Airspace System (NAS)	Minimal or no changes in the noise environment in the vicinity of

Project / Description	Potential for Cumulative Effects
Minor changes to procedures in response to operational issues or to accommodate requests from air carriers and GA may be evaluated under routine maintenance; FAA is not planning on any making any changes to the proposed flight paths below 3,000 ft. AGL.	MDW; no significant impacts; upcoming IFPs not expected to have significant impacts; appropriate NEPA analysis to be undertaken by FAA to consider operational impacts; potential minor changes to the proposed procedures evaluated as part of the Proposed Action in this EA are not expected to have significant impacts; appropriate NEPA analysis will be undertaken by FAA to consider operational impacts.

Table 49 Other Past, Present, and Reasonably Foreseeable Future Actions for Consideration of Cumulative Impacts

Project	Potential Environmental Impacts
<p>Projects at Other Airports in the Study Area</p> <p>Past, present and future projects at other airports in the study area are comprised of a wide variety of repair, rehabilitation, and expansion projects related to airside (i.e., runways) and landside (i.e., passenger terminals) facilities and infrastructure; major airport development projects in the study area include the O'Hare Modernization Program (OMP) and the proposed creation of the South Suburban commercial service airport.</p>	<p>Many airport rehabilitation projects involve the repair or replacement of existing facilities, such as airfield pavements, building, lighting systems, and utilities. These type projects usually generate little or no permanent environmental impact and construction-related impacts are short-term in duration. Airport development and expansion projects typically involve the construction of new facilities, expansion of existing facilities, and (in some cases) land acquisition to accommodate new and expanded facilities. These projects, in addition to generating constructions related impacts can also generate direct and indirect impacts that result in permanent changes to the environment. Most common airport development environmental concerns are those associated with air quality; noise and compatible land use; Section 4(f) resources; habitat and protected species; floodplains, hazardous materials; historic resources; socioeconomic impacts; transportation; water quality; and wetlands. Where required airport development projects include mitigation measures to offset significant impacts and/or meet regulatory program requirements. NEPA analyses would be undertaken by FAA and the respective Airport Sponsors to characterize construction and operational impacts. The FAA completed an EIS for the O'Hare Modernization Program and issued a Record of Decision in 2005. The Draft South Suburban Airport Layout Plan has been submitted to FAA by IDOT and the EIS is in process.</p> <p>The impacts associated with the Proposed Action would be mitigated below thresholds indicating a significant impact. When considered in conjunction with other airport development actions, substantial cumulative impacts resulting from the implementation of the Proposed Action are not anticipated.</p>
<p>Other Airspace Actions</p> <p>The FAA routinely updates, revises, and publishes new procedures for aircraft arrivals and departures; the FAA also routinely modifies aircraft routes and air traffic procedures to optimize air traffic.</p> <p>The City of Chicago is proceeding with modernization through its OMP, which reconfigures the airfield; the OMP includes a number of airspace changes associated with the reconfigured runway layout; the FAA considered these airspace changes in an EIS, which concluded there would be no significant noise impacts associated with the OMP's proposed high altitude airspace modifications; the OMP NEPA process was completed in 2005.</p> <p>FAA created an initiative called the Optimization of Airspace and Procedures in the Metroplex (OAPM); the Chicago area plan is scheduled to begin a study later in 2013 but this schedule is subject to change.</p>	<p>Most revisions to approach and departure procedures are minor and have negligible environmental impact. Major revisions and new procedures can alter the noise environment around an airport by altering flight tracks and flight profiles. These changes, which can sometimes generate significant impacts (i.e., noise and air quality), are usually experienced in close proximity to an airport.</p> <p>Major airspace initiatives and modifications can also generate environmental impacts, primarily noise and air quality impacts. Many of the changes occur at high elevations, usually one mile or more above the ground surface. These changes typically affect a broad area. Although the impacts may be regional in nature, the effects are usually slight for most of the impact area. The impacts associated with the Proposed Action would be mitigated below thresholds indicating a significant impact. The impacts associated with the Proposed Action are not significant. When considered in conjunction with other airspace actions in the study area, substantial cumulative impacts resulting from the implementation of the Proposed Action are not anticipated.</p>
<p>Other Major Development Projects</p> <p>Regional population growth will continue to generate the need for private and public improvement projects, including new</p>	<p>Since much of the land in the vicinity of MDW is urbanized and built-out, there is low potential for projects that would have substantial land use impacts. Further, it would appear that most new major highway, residential, commercial, and industrial</p>

Project	Potential Environmental Impacts
<p>housing, roads, highways and bridges, and commercial and industrial development; in addition, there will be numerous projects that replace existing facilities and infrastructure, enhance the capacity of existing facilities and infrastructure, or redevelop urban land.</p> <p>A regional project currently undergoing NEPA analysis is the Illiana Corridor Study, which is evaluating a possible transportation corridor from I-55 in Illinois to I-65 in Indiana; the Tier One EIS study was initiated in 2011 and should be completed in 2013; the Tier Two EIS study should be completed in the 2015 to 2016 timeframe.</p> <p>Although the area surrounding MDW is predominantly built-out, the area will continue to experience housing, transportation, and commercial projects.</p>	<p>development projects would not occur in the immediate vicinity of MDW. Because many of the private and public development projects are subject to federal, state, and/or local environmental reviews and approvals, it is anticipated that most projects would not have significant environmental impacts or include mitigation if significant impacts would occur.</p> <p>The impacts associated with the Proposed Action would be mitigated below thresholds indicating a significant impact. When considered in conjunction with other development projects in the study area, substantial cumulative impacts resulting from the implementation of the Proposed Action are not anticipated.</p>

Noise and noise-related impacts include changes in noise exposure for populations, compatible land use, potential Section 4(f) resources, and historic properties. Implementation of the Proposed Action addressed in this EA would result in significant changes in noise exposure, which would be mitigated through the City of Chicago Department of Aviation residential sound insulation program. Three of the categories of past, present, and reasonably foreseeable projects have the potential to contribute cumulatively to the noise impacts of the Proposed Action:

- **Projects at MDW:** As discussed in Table 48, would not be expected to have a significant cumulative noise impact.
- **Other Airport Projects:** In general, the other airport development projects in the Study Area would be sufficient distances from MDW such that the environmental impacts associated with those projects would not necessarily overlap. Therefore, no significant cumulative impacts are expected.
- **Other Airspace Actions:** Since the grid points having a value of DNL 65 dB or greater are concentrated near the study airports, the combination of the regional airspace actions with the Proposed Action would not be expected to have significant cumulative noise impacts.
- **Other Major Development Projects:** In general and when viewed in aggregate, other development projects in the Study Area, and in particular regional transportation projects, would be sufficient distances from MDW such that the environmental impacts associated with those projects would not necessarily overlap. Therefore, no significant cumulative impacts are expected.

In summary, based on the review of past, present, and reasonably foreseeable projects, the FAA does not expect the Proposed Action to contribute to changes in noise exposure that would cumulatively result in significant impacts.

The other projects listed in the cumulative impact section would not result in significant impacts.

5.11.3.1 Potential for Cumulative Impacts on Compatible Land Use

The application of federal and state air quality regulations, along with significant technological improvements aimed at reducing impacts on air quality, have acted to offset emission increases caused by regional population and development growth. The Proposed Action would generate

noise impacts that would create incompatible land uses in certain residential areas west of PBI (see Sections 5.2 and 5.3). These impacts would be mitigated through sound attenuation, land acquisition, and/or aviation easements. Impacts resulting from the cumulative projects are anticipated, but are not expected to be substantial, as the area surrounding MDW is mostly developed and major development projects would be implemented in light of land use and zoning plans. The moderate land use impacts of the Proposed Action, when considered in addition to land use impacts of other on- or off-airport projects, are not expected to lead to additional substantial cumulative land use impacts.

5.11.3.2 Potential for Cumulative Impacts on Air Quality

The application of federal and state air quality regulations along with significant technological improvements aimed at reducing impacts on air quality have acted to offset emission increases caused by regional population and development growth. The EPA has designated parts of the study area as non-attainment areas for the 8-hour ozone NAAQS (see Section 4.3.5). As discussed in Section 5.6, the Proposed Action would not have a significant impact on air quality as compared to the No Action Alternative and is presumed to conform to the SIP. Therefore, it would not have the potential to cause significant cumulative impacts. Moreover, given the cumulative nature of air quality, which examines effects from multiple emissions sources over extended geographical and temporal extents and which employs a regulatory scheme of inventorying permitted emissions and comparing those to NAAQS. The cumulative impacts of all projects surrounding MDW, including the implementation of the Proposed Action, would not result in any change to the attainment status for the various criteria air pollutants. Based on the review of past, present, and reasonably foreseeable projects, the FAA does not expect the Proposed Action to contribute to changes in air quality that would cumulatively result in significant impacts.

5.11.3.3 Potential for Cumulative Impacts on Natural Resources and Energy Supply

As discussed in Section 5.7.3, implementation of the Proposed Action would not be expected to affect local energy supplies adversely. With the exception of aviation fuel, implementation of the Proposed Action would not involve the use of local energy supplies or natural resources since there is no construction or land disturbing activities proposed (see Section 4.3.6). Past, present, and future actions in the study area have consumed energy and would continue to consume energy and natural resources during their construction and operation. In the study area, the infrastructure for aviation fuel distribution is well developed and robust enough to support the proposed development projects (terminal building expansions, forecasted growth in aviation operations). As it relates to fuel distribution infrastructure capacity for aviation users, the Proposed Action is not expected to cumulatively affect local supplies of natural resources. The possibility of a significant cumulative impact is remote. Although some of the other past, present, and reasonably foreseeable future actions would lead to increases in the amount of energy and resources consumed, none of these projects in combination with the Proposed Action is likely to cause increases in fuel consumption that would exceed the capacity of the region to serve its energy needs. Although the Proposed Action would involve a small increase in fuel consumption, the change compared to the No Action is of such a small magnitude that its effect upon local energy supplies would not be measurable. Therefore, based on the review of past, present, and reasonably foreseeable actions, the FAA does not expect the Proposed Action to have a significant cumulative impact on natural resources and energy supply.

5.11.3.4 Potential for Cumulative Impacts on Climate

As discussed in Section 5.8, the slight increase in fuel burn caused by the Proposed Action would cause a corresponding increase in greenhouse gas (GHG) emissions. This increase would constitute an extremely small contribution to national and global GHG emissions. The cumulative impact of this proposed action on the global climate when added to other past, present, and reasonably foreseeable future actions is not currently scientifically predictable. Aviation has been calculated to contribute approximately 3 percent of global carbon dioxide (CO₂) emissions; this contribution may grow to 5 percent by 2050. Actions are underway within the U.S. and by other nations to reduce aviation's contribution through such measures as new aircraft technologies to reduce emissions and improve fuel efficiency, renewable alternative fuels with lower carbon footprints, more efficient air traffic management, market-based measures, and environmental regulations including an aircraft CO₂ standard. The U.S. has ambitious goals to achieve carbon-neutral growth for aviation by 2020 compared to a 2005 baseline, and to gain absolute reductions in GHG emissions by 2050. At present, there are no calculations of the extent to which measures individually or cumulatively may affect aviation's CO₂ emissions. Moreover, there are large uncertainties regarding aviation's impact on climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (e. g., NASA, NOAA, EPA, and DOE), has developed the Aviation Climate Change Research Initiative (ACCRI) in an effort to advance scientific understanding of regional and global climate impacts of aircraft emissions, with quantified uncertainties for current and projected aviation scenarios under changing atmospheric conditions.¹²⁷

¹²⁷ Nathan Brown, et al, *The U.S. Strategy for Tackling Aviation Climate Impacts*, 2010, 27th International Congress of the Aeronautical Sciences.

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